

# **EXHIBIT 1**

## **(Part 1 of 2)**

### **CISCO'S SUBMISSION OF PROTECTABLE ELEMENTS FROM ITS COPYRIGHTED WORKS**

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**CISCO'S COPYRIGHTED WORKS**

Cisco alleges that defendant Arista Networks, Inc. (“Arista”) copied Cisco’s copyrighted command-line user interface (“user interface”) and associated technical documents. As set forth in Cisco’s analytic dissection briefing, Cisco’s user interface includes a set of textual expressions by which a human operator uses text-based expressions to interact with, manage, and configure networking equipment such as routers and switches, as well as the textual responses the user receives in those interactions. In fashioning its copyright claims, Cisco has already filtered out unprotectable elements of its user interface and technical documentation that Arista has copied such as single word command expressions. Cisco asserts that Arista unlawfully copied protectable elements of its user interface and protectable portions of its technical documentation. Specifically, Cisco contends that the following five categories of protectable elements from its user interface, all of which together make up the look and feel of Cisco’s user interface, should be included in a comparison between Cisco’s copyrighted user interface and Arista’s infringing user interface: (1) multiword command expressions, (2) command modes and prompts, (3) command hierarchies, (4) command responses/outputs, and (5) help descriptions. Cisco also contends that specific portions of its technical documents/user manuals that explain the operation of Cisco’s user interface also are protectable. For each category, Cisco has identified the protectable elements below.

### **MULTIWORD COMMAND EXPRESSIONS**

Cisco contends that the following multiword command expressions are protectable elements of Cisco's user interface as individual command expressions and as collections of multiword command expressions associated with specific operating systems, identified below as IOS, IOS-XR, IOS-XE, and NX-OS. As reflected in the tables below, many multiword commands appear in more than one Cisco operating system. Further, some commands are associated with different networking protocols, *e.g.*, OSPFv2 or OSPFv3, which are policies comprised of rules, procedures, and formats that define how devices communicate with each other. For purposes of this submission, where a multiword command is associated with more than one networking protocol, Cisco has listed the command expression once per operating system so as to avoid any confusion. For example, the "area nssa" multiword command expression can be used for OSPFv2 or OSPFv3, but Cisco lists that command once as "area nssa."

As set forth in Cisco's analytic dissection brief, Cisco's multiword command expressions are typed into Cisco's user interface by system operators and are then displayed on a computer screen that is connected to a networking device such as a switch or router. Cisco engineers could have chosen a graphical user interface (as other vendors have done), Linux interfaces (like Arista's alternative approach, which is used by 20% of its customers), or selected any number of different word combinations for each of the multiword command expressions listed below (as other vendors have done). Further, the development of Cisco's multiword command expressions was the result of a creative process within the company and the professional judgment of Cisco employees. As the Court's summary judgment order states: "In *CDN Inc. v. Kapes*, 197 F.3d 1256, 1260 (9th Cir. 1999), a case involving collectible coins, the plaintiff's employees relied upon coin publications, real-world transactions, supply and demand projections, analyze the effect of the economy and foreign policies to determine the wholesale prices of coins. The Ninth Circuit found that prices in

CDN's price guides were copyrightable because CDN used its judgment to create the prices." Dkt.

482 at 12. The Court's order then quotes the following passage from *CDN*:

[W]hat is important is the fact that [parties] arrive at the prices they list through a process that involves using their judgment to distill and extrapolate from factual data. It is simply not a process through which they discover a preexisting historical fact, but rather a process by which they create a price which, in their best judgment, represents the value of an item as closely as possible... This *process* imbues the prices listed with sufficient creativity and originality to make them copyrightable.

*Id.* at 13 (emphasis added by the Court). The Court thereafter concluded:

The fact that CDN used a process to determine, in its judgment, the value of coins was enough for the Ninth Circuit to find CDN's prices were copyrightable. The Ninth Circuit did not engage in an analysis of each and every price CDN calculated to determine if it possessed a minimal degree of creativity and originality. . . . Arista misreads *CDN* as it applies to this case. If Cisco copied historical commands, without more, there may be merit to Arista's argument. Cisco has provided evidence that it used its own judgment and expertise in arriving at multi word commands. Second, Cisco's attempt to rely on a process is not an end-around the statutory presumption applied to timely copyright registrations because Cisco has pointed to several pieces of evidence indicating that there was a creative process in place.

*Id.* (internal quotation marks, citations, and brackets omitted). As in *CDN*, Cisco's multiword command expressions resulted from a creative process.

### IOS

aaa accounting
aaa authentication login
aaa authorization config-commands
aaa authorization console
aaa group server radius
aaa group server tacacs+
address-family
aggregate-address
area default-cost
area nssa
area nssa default- information-originate
area nssa no-summary
area nssa translate type7 always
area range
area stub

arp timeout
banner login
banner motd
bfd all-interfaces
bgp client-to-client reflection
bgp cluster-id
bgp confederation identifier
bgp confederation peers
bgp listen limit
bgp log-neighbor-changes
bgp redistribute-internal
boot system
channel-group
clear arp-cache
clear counters
clear ip bgp
clear ip igmp group
clear ip mroute
clear ip msdp sa-cache
clear ip nat translation
clear ip ospf neighbor
clear ipv6 neighbors
clear ipv6 ospf force-spf
clear lldp counters
clear lldp table
clear mac-address-table dynamic
clock set
clock timezone
control-plane
default-information originate
default-metric
distance bgp
domain-id
dot1x max-reauth-req
dot1x pae authenticator
dot1x port-control
dot1x reauthentication
dot1x system-auth-control
dot1x timeout quiet-period
dot1x timeout reauth-period
dot1x timeout tx-period
enable secret
erase startup-config
errdisable detect cause link- flap
errdisable recovery cause
errdisable recovery interval

flowcontrol receive
flowcontrol send
interface loopback
interface port-channel
interface vlan
ip access-group
ip access-list
ip access-list standard
ip address
ip as-path access-list
ip community-list expanded
ip community-list standard
ip dhcp smart-relay
ip dhcp snooping
ip dhcp snooping information option
ip dhcp snooping vlan
ip domain lookup
ip domain name
ip extcommunity-list expanded
ip extcommunity-list standard
ip helper-address
ip host
ip http client source-interface
ip icmp redirect
ip igmp last-member-query- count
ip igmp last-member-query- interval
ip igmp query-interval
ip igmp query-max-response- time
ip igmp snooping
ip igmp snooping querier
ip igmp snooping vlan
ip igmp snooping vlan immediate-leave
ip igmp snooping vlan mrouter
ip igmp snooping vlan static
ip igmp static-group
ip igmp version
ip load-sharing
ip local-proxy-arp
ip msdp cache-sa-state
ip msdp default-peer
ip msdp description
ip msdp keepalive
ip msdp mesh-group
ip msdp originator-id
ip msdp peer
ip msdp sa-filter in

ip msdp sa-filter out
ip msdp sa-limit
ip msdp shutdown
ip msdp timer
ip multicast boundary
ip multicast-routing
ip name-server
ip nat pool
ip nat translation tcp-timeout
ip nat translation udp-timeout
ip ospf authentication
ip ospf authentication-key
ip ospf bfd
ip ospf cost
ip ospf dead-interval
ip ospf hello-interval
ip ospf message-digest-key
ip ospf name-lookup
ip ospf network
ip ospf priority
ip ospf retransmit-interval
ip ospf shutdown
ip ospf transmit-delay
ip pim bfd
ip pim bsr-border
ip pim bsr-candidate
ip pim dr-priority
ip pim log-neighbor-changes
ip pim neighbor-filter
ip pim query-interval
ip pim register-source
ip pim rp-address
ip pim rp-candidate
ip pim sparse-mode
ip pim spt-threshold
ip pim spt-threshold group-list
ip pim ssm range
ip prefix-list
ip protocol
ip proxy-arp
ip radius source-interface
ip rip v2-broadcast
ip route
ip routing
ip tacacs source-interface
ipv6 access-list



ipv6 address
ipv6 dhcp relay destination
ipv6 enable
ipv6 host
ipv6 access-group
ipv6 nd managed-config-flag
ipv6 nd ns-interval
ipv6 nd other-config-flag
ipv6 nd prefix
ipv6 nd ra interval
ipv6 nd ra lifetime
ipv6 nd ra suppress
ipv6 nd reachable-time
ipv6 nd router-preference
ipv6 neighbor
ipv6 ospf area
ipv6 ospf cost
ipv6 ospf dead-interval
ipv6 ospf hello-interval
ipv6 ospf network
ipv6 ospf priority
ipv6 ospf retransmit-interval
ipv6 ospf transmit-delay
ipv6 prefix-list
ipv6 route
ipv6 router ospf
ipv6 unicast-routing
isis hello-interval
isis hello-multiplier
isis lsp-interval
isis metric
isis priority
is-type
lACP port-priority
lACP rate
lACP system-priority
link state group
link state track
lldp holdtime
lldp receive
lldp reinit
lldp run
lldp timer
lldp tlv-select
lldp transmit
load interval

log-adjacency-changes
logging host
mac access-group
mac address-table aging-time
mac address-table static
mac-address
maximum-paths
neighbor activate
neighbor allowas-in
neighbor default-originate
neighbor description
neighbor ebgp-multihop
neighbor fall-over bfd
neighbor local-as
neighbor next-hop-self
neighbor password
neighbor peer-group
neighbor remote-as
neighbor remove-private-as
neighbor route-map
neighbor route-reflector- client
neighbor send-community
neighbor shutdown
neighbor soft-reconfiguration
neighbor timers
neighbor transport connection-mode
neighbor update-source
neighbor weight
network area
no snmp-server
ntp authenticate
ntp authentication-key
ntp server
ntp source
ntp trusted-key
passive-interface
passive-interface default
port-channel load-balance
port-channel min-links
ptp priority1
ptp priority2
private-vlan
private-vlan mapping
radius-server deadtime
radius-server host
radius-server key

radius-server retransmit
radius-server timeout
redundancy force-switchover
route-map
router bgp
router isis
router ospf
router rip
router-id
routing-context vrf
service sequence-numbers
set-overload-bit
show aaa method-lists
show aaa sessions
show arp
show bfd neighbors
show clock
show dot1q-tunnel
show dot1x
show dot1x all summary
show dot1x statistics
show environment all
show environment cooling
show environment temperature
show etherchannel
show hosts
show interfaces
show interfaces capabilities
show interfaces description
show interfaces flowcontrol
show interfaces private-vlan mapping
show interfaces status
show interfaces switchport
show interfaces switchport backup
show interfaces transceiver
show interfaces trunk
show inventory
show ip access-lists
show ip arp
show ip bgp
show ip bgp community
show ip bgp neighbors
show ip bgp neighbors
show ip bgp paths
show ip bgp peer-group
show ip bgp regexp

show ip bgp summary
show ip community-list
show ip dhcp snooping
show ip extcommunity-list
show ip helper-address
show ip igmp groups
show ip igmp interface
show ip igmp snooping
show ip igmp snooping groups
show ip igmp snooping mrouter
show ip igmp snooping querier
show ip interface
show ip interface brief
show ip mfib
show ip mroute
show ip mroute count
show ip msdp peer
show ip msdp rpf-peer
show ip msdp sa-cache
show ip msdp summary
show ip nat translations
show ip ospf
show ip ospf border-routers
show ip ospf database database-summary
show ip ospf interface
show ip ospf neighbor
show ip ospf request-list
show ip ospf retransmission- list
show ip pim interface
show ip pim neighbor
show ip pim rp
show ip pim rp-hash
show ip prefix-list
show ip rip database
show ip rip neighbors
show ip route
show ip route summary
show ip route tag
show ipv6 access-list
show ipv6 bgp community
show ipv6 interface
show ipv6 neighbors
show ipv6 ospf
show ipv6 ospf border- routers
show ipv6 ospf interface
show ipv6 ospf neighbor

show ipv6 prefix-list
show ipv6 route
show ipv6 route summary
show ipv6 route tag
show isis database
show isis topology
show link state group
show lldp
show lldp neighbors
show lldp traffic
show mac access-list
show mac address-table
show mac address-table aging time
show module
show monitor session
show ntp associations
show ntp status
show policy-map control-plane
show policy-map interface
show port-security
show port-security address
show privilege
show redundancy states
show reload
show route-map
show snmp
show snmp chassis
show snmp community
show snmp contact
show snmp engineID
show snmp group
show snmp host
show snmp location
show snmp mib
show snmp user
show snmp view
show spanning-tree
show spanning-tree mst
show spanning-tree mst configuration
show storm-control
show tacacs
show track
show version
show vlan
show vrf
show vrrp

snmp trap link-status
snmp-server chassis-id
snmp-server community
snmp-server contact
snmp-server enable traps
snmp-server engineID local
snmp-server engineID remote
snmp-server group
snmp-server host
snmp-server location
snmp-server source-interface
snmp-server user
snmp-server view
spanning-tree bpdupfilter
spanning-tree bpduguard
spanning-tree cost
spanning-tree guard
spanning-tree link-type
spanning-tree loopguard default
spanning-tree mode
spanning-tree mst configuration
spanning-tree portfast bpdupfilter default
spanning-tree portfast bpduguard default
spanning-tree port-priority
spanning-tree transmit hold-count
spanning-tree vlan
spf-interval
storm-control
switchport access vlan
switchport backup interface
switchport mode
switchport port-security
switchport port-security maximum
switchport private-vlan mapping
switchport trunk allowed vlan
switchport trunk native vlan
switchport vlan mapping
tacacs-server host
tacacs-server key
tacacs-server timeout
terminal monitor
timers basic
timers bgp
timers lsa arrival
timers throttle lsa all
timers throttle spf

vlan internal allocation policy
vrf definition
vrf forwarding
vrrp authentication
vrrp delay reload
vrrp description
vrrp ip
vrrp ip secondary
vrrp preempt
vrrp priority
vrrp shutdown
vrrp timers advertise

### IOS-XR

aaa accounting
aaa authentication login
aaa group server radius
aaa group server tacacs+
address-family
aggregate-address
arp timeout
banner login
banner motd
bgp client-to-client reflection
bgp cluster-id
bgp confederation identifier
bgp confederation peers
bgp log-neighbor-changes
bgp redistribute-internal
channel-group
clear arp-cache
clear counters
clear ipv6 neighbors
clear lldp counters
clear lldp table
clock set
clock timezone
control-plane
default-information originate
default-metric
distance bgp
domain-id
interface loopback
ip access-list
ip address

ip as-path access-list
ip domain lookup
ip helper-address
ip host
ip multicast-routing
ip ospf cost
ip ospf message-digest-key
ip pim rp-address
ip pim sparse-mode
ip pim spt-threshold
ip prefix-list
ipv6 access-list
ipv6 address
ipv6 enable
ipv6 access-group
ipv6 nd managed-config-flag
ipv6 nd ns-interval
ipv6 nd other-config-flag
ipv6 nd prefix
ipv6 nd ra interval
ipv6 nd ra lifetime
ipv6 nd reachable-time
ipv6 neighbor
ipv6 prefix-list
isis hello-interval
is-type
lACP system-priority
lldp holdtime
lldp reinit
lldp timer
lldp tlv-select
load interval
log-adjacency-changes
logging host
mac-address
maximum-paths
neighbor ebgp-multihop
neighbor password
network area
no snmp-server
policy-map type qos
ptp priority1
ptp priority2
radius-server deadtime
radius-server host
radius-server key



radius-server retransmit
radius-server timeout
route-map
router bgp
router isis
router ospf
router rip
router-id
set-overload-bit
show arp
show clock
show environment all
show environment power
show environment temperature
show hosts
show interfaces
show inventory
show ip bgp
show ip interface
show ip interface brief
show ip ospf
show ip route
show ipv6 access-list
show ipv6 interface
show ipv6 neighbors
show ipv6 prefix-list
show isis database
show isis interface
show isis topology
show lacp counters
show lldp
show lldp neighbors
show lldp traffic
show module
show monitor session
show ntp associations
show ntp status
show policy-map interface
show radius
show redundancy states
show snmp
show snmp engineID
show snmp group
show snmp host
show snmp mib
show snmp user

show snmp view
show spanning-tree mst
show spanning-tree mst configuration
show spanning-tree mst interface
show tacacs
show track
show version
show vlan
show vrf
show vrrp
snmp trap link-status
snmp-server chassis-id
snmp-server community
snmp-server contact
snmp-server enable traps
snmp-server engineID local
snmp-server engineID remote
snmp-server group
snmp-server host
snmp-server location
snmp-server user
snmp-server view
spf-interval
storm-control
tacacs-server host
tacacs-server key
tacacs-server timeout
terminal monitor
timers basic
timers bgp
timers lsa arrival
timers throttle lsa all
timers throttle spf
vrrp delay reload
vrrp ip
vrrp preempt
vrrp priority

### IOS-XE

aaa accounting
aaa accounting dot1x
aaa authentication login
aaa authorization config-commands
aaa authorization console

aaa group server radius
aaa group server tacacs+
address-family
aggregate-address
area default-cost
area nssa
area range
area stub
arp timeout
banner login
banner motd
bfd all-interfaces
bgp client-to-client reflection
bgp cluster-id
bgp confederation identifier
bgp confederation peers
bgp listen limit
bgp log-neighbor-changes
bgp redistribute-internal
boot system
channel-group
clear arp-cache
clear counters
clear ip bgp
clear ip igmp group
clear ip mroute
clear ip msdp sa-cache
clear ip nat translation
clear ipv6 neighbors
clear ipv6 ospf force-spf
clear lldp counters
clear lldp table
clock set
clock timezone
control-plane
default-information originate
default-metric
distance bgp
domain-id
dot1x max-reauth-req
dot1x pae authenticator
dot1x port-control
dot1x reauthentication
dot1x system-auth-control
dot1x timeout quiet-period
dot1x timeout reauth-period

dot1x timeout tx-period
enable secret
erase startup-config
errdisable recovery cause
errdisable recovery interval
flowcontrol receive
flowcontrol send
interface ethernet
interface loopback
interface port-channel
interface vlan
ip access-group
ip access-list
ip access-list standard
ip address
ip as-path access-list
ip community-list expanded
ip community-list standard
ip dhcp smart-relay
ip dhcp smart-relay global
ip dhcp snooping
ip dhcp snooping information option
ip dhcp snooping vlan
ip domain lookup
ip domain name
ip extcommunity-list expanded
ip extcommunity-list standard
ip helper-address
ip host
ip http client source-interface
ip icmp redirect
ip igmp last-member-query- count
ip igmp last-member-query- interval
ip igmp query-interval
ip igmp query-max-response- time
ip igmp snooping
ip igmp snooping querier
ip igmp snooping vlan
ip igmp snooping vlan immediate-leave
ip igmp snooping vlan mrouter
ip igmp snooping vlan static
ip igmp static-group
ip igmp version
ip load-sharing
ip local-proxy-arp
ip msdp cache-sa-state

ip msdp default-peer
ip msdp description
ip msdp keepalive
ip msdp mesh-group
ip msdp originator-id
ip msdp peer
ip msdp sa-filter in
ip msdp sa-filter out
ip msdp sa-limit
ip msdp shutdown
ip msdp timer
ip multicast boundary
ip multicast-routing
ip name-server
ip nat pool
ip nat translation tcp-timeout
ip nat translation udp-timeout
ip ospf authentication
ip ospf authentication-key
ip ospf bfd
ip ospf cost
ip ospf dead-interval
ip ospf hello-interval
ip ospf message-digest-key
ip ospf name-lookup
ip ospf network
ip ospf priority
ip ospf retransmit-interval
ip ospf shutdown
ip ospf transmit-delay
ip pim bsr-border
ip pim bsr-candidate
ip pim dr-priority
ip pim log-neighbor-changes
ip pim neighbor-filter
ip pim query-interval
ip pim register-source
ip pim rp-address
ip pim rp-candidate
ip pim sparse-mode
ip pim spt-threshold
ip pim ssm range
ip prefix-list
ip proxy-arp
ip radius source-interface
ip rip v2-broadcast

ip route
ip routing
ip tacacs source-interface
ipv6 access-list
ipv6 address
ipv6 dhcp relay destination
ipv6 enable
ipv6 host
ipv6 access-group
ipv6 nd managed-config-flag
ipv6 nd ns-interval
ipv6 nd other-config-flag
ipv6 nd prefix
ipv6 nd ra interval
ipv6 nd ra lifetime
ipv6 nd ra suppress
ipv6 nd reachable-time
ipv6 nd router-preference
ipv6 neighbor
ipv6 ospf area
ipv6 ospf cost
ipv6 ospf dead-interval
ipv6 ospf hello-interval
ipv6 ospf network
ipv6 ospf priority
ipv6 ospf retransmit-interval
ipv6 ospf transmit-delay
ipv6 prefix-list
ipv6 route
ipv6 router ospf
ipv6 unicast-routing
isis hello-interval
isis hello-multiplier
isis lsp-interval
isis metric
isis priority
is-type
lACP port-priority
lACP rate
lACP system-priority
link state group
link state track
lldp holdtime
lldp timer
lldp transmit
load interval

log-adjacency-changes
logging host
mac access-group
mac address-table aging-time
mac address-table static
mac-address
maximum-paths
neighbor activate
neighbor allowas-in
neighbor default-originate
neighbor description
neighbor ebgp-multihop
neighbor fall-over bfd
neighbor local-as
neighbor next-hop-self
neighbor password
neighbor peer-group
neighbor remote-as
neighbor remove-private-as
neighbor route-map
neighbor route-reflector- client
neighbor send-community
neighbor shutdown
neighbor soft-reconfiguration
neighbor timers
neighbor update-source
neighbor weight
network area
no snmp-server
ntp authenticate
ntp authentication-key
ntp server
ntp source
ntp trusted-key
passive-interface
passive-interface default
port-channel load-balance
port-channel min-links
ptp priority1
ptp priority2
private-vlan
private-vlan mapping
radius-server deadtime
radius-server host
radius-server key
radius-server retransmit

radius-server timeout
redundancy force-switchover
route-map
router bgp
router isis
router ospf
router rip
router-id
routing-context vrf
service sequence-numbers
set-overload-bit
show aaa method-lists
show aaa sessions
show arp
show bfd neighbors
show clock
show dot1x
show dot1x statistics
show environment all
show environment cooling
show environment temperature
show etherchannel
show hosts
show interfaces
show interfaces capabilities
show interfaces description
show interfaces flowcontrol
show interfaces private-vlan mapping
show interfaces status
show interfaces switchport
show interfaces switchport backup
show interfaces transceiver
show interfaces trunk
show inventory
show ip access-lists
show ip arp
show ip bgp
show ip bgp community
show ip bgp neighbors
show ip bgp neighbors
show ip bgp paths
show ip bgp peer-group
show ip bgp regexp
show ip bgp summary
show ip community-list
show ip dhcp snooping



show ip extcommunity-list
show ip helper-address
show ip igmp groups
show ip igmp interface
show ip igmp snooping
show ip igmp snooping groups
show ip igmp snooping mrouter
show ip interface
show ip interface brief
show ip mfib
show ip mroute
show ip mroute count
show ip msdp peer
show ip msdp rpf-peer
show ip msdp sa-cache
show ip msdp summary
show ip nat translations
show ip ospf
show ip ospf border-routers
show ip ospf database database-summary
show ip ospf interface
show ip ospf neighbor
show ip ospf request-list
show ip ospf retransmission- list
show ip pim interface
show ip pim neighbor
show ip pim rp
show ip pim rp-hash
show ip prefix-list
show ip rip database
show ip rip neighbors
show ip route
show ip route summary
show ipv6 access-list
show ipv6 interface
show ipv6 neighbors
show ipv6 ospf
show ipv6 ospf border- routers
show ipv6 ospf interface
show ipv6 ospf neighbor
show ipv6 prefix-list
show ipv6 route
show ipv6 route summary
show isis database
show isis topology
show lacp counters

show link state group
show lldp
show lldp neighbors
show lldp traffic
show mac access-list
show mac address-table
show mac address-table aging time
show mac address-table count
show module
show monitor session
show ntp associations
show ntp status
show policy-map control-plane
show policy-map interface
show port-security
show port-security address
show port-security interface
show privilege
show redundancy states
show reload
show role
show route-map
show snmp
show snmp chassis
show snmp community
show snmp contact
show snmp engineID
show snmp group
show snmp host
show snmp location
show snmp mib
show snmp user
show snmp view
show spanning-tree
show spanning-tree mst
show spanning-tree mst configuration
show storm-control
show tacacs
show track
show version
show vlan
show vrf
show vrrp
snmp trap link-status
snmp-server chassis-id
snmp-server community

snmp-server contact
snmp-server enable traps
snmp-server engineID local
snmp-server engineID remote
snmp-server group
snmp-server host
snmp-server location
snmp-server source-interface
snmp-server user
snmp-server view
spanning-tree mst configuration
spanning-tree vlan
spf-interval
storm-control
switchport access vlan
switchport mode
switchport port-security
switchport port-security maximum
switchport private-vlan mapping
switchport trunk allowed vlan
switchport vlan mapping
tacacs-server host
tacacs-server key
tacacs-server timeout
terminal monitor
timers basic
timers bgp
timers lsa arrival
timers throttle lsa all
timers throttle spf
vrf definition
vrf forwarding
vrrp authentication
vrrp delay reload
vrrp description
vrrp ip
vrrp ip secondary
vrrp preempt
vrrp priority
vrrp shutdown
vrrp timers advertise

NX-OS

aaa accounting dot1x
aaa group server radius
aaa group server tacacs+
address-family
aggregate-address
area default-cost
area nssa
area nssa default- information-originate
area nssa no-summary
area nssa translate type7 always
area range
area stub
banner motd
bgp confederation peers
bgp log-neighbor-changes
boot system
channel-group
class-map type control-plane
clear counters
clear ip arp
clear ip bgp
clear ip mroute
clear ip msdp sa-cache
clear ip ospf neighbor
clear ipv6 neighbors
clear mac-address-table dynamic
clear spanning-tree counters
clock set
clock timezone
control-plane
default-information originate
default-metric
dot1x max-reauth-req
dot1x pae authenticator
dot1x port-control
dot1x reauthentication
dot1x system-auth-control
dot1x timeout quiet-period
dot1x timeout reauth-period
dot1x timeout tx-period
enable secret
errdisable recovery cause
errdisable recovery interval
flowcontrol receive

flowcontrol send
interface ethernet
interface loopback
interface port-channel
interface vlan
ip access-group
ip access-list
ip access-list standard
ip address
ip as-path access-list
ip community-list expanded
ip community-list standard
ip dhcp smart-relay
ip dhcp smart-relay global
ip dhcp snooping
ip dhcp snooping information option
ip dhcp snooping vlan
ip domain lookup
ip domain name
ip extcommunity-list expanded
ip extcommunity-list standard
ip host
ip igmp last-member-query- count
ip igmp query-interval
ip igmp query-max-response- time
ip igmp snooping
ip igmp snooping querier
ip igmp startup-query- interval
ip igmp startup-query-count
ip igmp static-group
ip igmp version
ip local-proxy-arp
ip msdp description
ip msdp group-limit
ip msdp keepalive
ip msdp mesh-group
ip msdp originator-id
ip msdp peer
ip msdp sa-limit
ip msdp shutdown
ip name-server
ip ospf authentication
ip ospf authentication-key
ip ospf bfd
ip ospf cost
ip ospf dead-interval

ip ospf hello-interval
ip ospf message-digest-key
ip ospf network
ip ospf priority
ip ospf retransmit-interval
ip ospf shutdown
ip ospf transmit-delay
ip pim anycast-rp
ip pim bfd
ip pim bfd-instance
ip pim bsr-candidate
ip pim dr-priority
ip pim log-neighbor-changes
ip pim register-source
ip pim rp-address
ip pim rp-candidate
ip pim sparse-mode
ip pim ssm range
ip prefix-list
ip proxy-arp
ip radius source-interface
ip route
ip routing
ip tacacs source-interface
ipv6 access-list
ipv6 address
ipv6 host
ipv6 nd managed-config-flag
ipv6 nd ns-interval
ipv6 nd other-config-flag
ipv6 nd prefix
ipv6 nd ra interval
ipv6 nd ra lifetime
ipv6 nd reachable-time
ipv6 neighbor
ipv6 prefix-list
ipv6 route
ipv6 unicast-routing
isis hello-interval
isis hello-multiplier
isis lsp-interval
isis metric
isis passive
isis passive interface
isis priority
is-type

lacp port-priority
lacp rate
lacp system-priority
lldp holdtime
lldp receive
lldp reinit
lldp timer
lldp tlv-select
lldp transmit
load interval
log-adjacency-changes
mac access-group
mac access-list
mac address-table aging-time
mac address-table static
mac-address
maximum-paths
neighbor ebgp-multihop
neighbor next-hop-self
neighbor password
neighbor remote-as
neighbor route-map
neighbor route-reflector- client
neighbor send-community
neighbor update-source
neighbor weight
ntp authenticate
ntp authentication-key
ntp server
ntp source
ntp trusted-key
passive-interface
passive-interface default
policy-map type control- plane
policy-map type qos
port-channel load-balance
port-channel min-links
ptp priority1
ptp priority2
priority-flow-control mode
private-vlan
private-vlan mapping
ptp domain
ptp sync interval
radius-server deadtime
radius-server host

radius-server key
radius-server retransmit
radius-server timeout
route-map
router bgp
router isis
router ospf
router rip
router-id
routing-context vrf
set-overload-bit
show arp
show bfd neighbors
show clock
show dot1q-tunnel
show dot1x
show dot1x all summary
show environment power
show hostname
show hosts
show interfaces
show interfaces capabilities
show interfaces description
show interfaces private-vlan mapping
show interfaces status
show interfaces switchport
show interfaces transceiver
show interfaces trunk
show inventory
show ip access-lists
show ip arp
show ip bgp
show ip bgp community
show ip bgp neighbors
show ip community-list
show ip dhcp snooping
show ip extcommunity-list
show ip igmp groups
show ip igmp interface
show ip igmp snooping
show ip igmp snooping groups
show ip igmp snooping mrouter
show ip igmp snooping querier
show ip interface
show ip mroute
show ip msdp mesh-group



show ip msdp peer
show ip msdp sa-cache
show ip msdp summary
show ip ospf
show ip ospf border-routers
show ip ospf database database-summary
show ip ospf interface
show ip ospf neighbor
show ip ospf request-list
show ip ospf retransmission- list
show ip pim interface
show ip pim neighbor
show ip pim rp
show ip pim rp-hash
show ip prefix-list
show ip rip neighbors
show ip route
show ip route summary
show ipv6 access-list
show ipv6 bgp
show ipv6 bgp community
show ipv6 bgp neighbors
show ipv6 bgp summary
show ipv6 interface
show ipv6 neighbors
show ipv6 prefix-list
show ipv6 route
show ipv6 route summary
show isis database
show isis interface
show isis topology
show lacp counters
show lacp interface
show lacp neighbor
show lldp neighbors
show lldp traffic
show mac access-list
show mac address-table
show mac address-table aging time
show mac address-table count
show module
show monitor session
show ntp associations
show ntp status
show policy-map control-plane
show policy-map interface

show policy-map interface control-plane
show port-channel summary
show port-channel traffic
show port-security
show port-security address
show port-security interface
show privilege
show ptp clock
show ptp parent
show ptp time-property
show radius
show role
show route-map
show snmp
show snmp community
show snmp engineID
show snmp group
show snmp host
show snmp source-interface
show snmp trap
show snmp user
show spanning-tree
show spanning-tree blockedports
show spanning-tree bridge
show spanning-tree interface
show spanning-tree mst
show spanning-tree mst configuration
show spanning-tree mst interface
show spanning-tree root
show tacacs
show track
show user-account
show version
show vlan
show vlan private-vlan
show vlan summary
show vrf
show vrrp
snmp-server community
snmp-server contact
snmp-server enable traps
snmp-server host
snmp-server location
snmp-server source-interface
snmp-server user
spanning-tree bpdupfilter

spanning-tree bpduguard
spanning-tree bridge assurance
spanning-tree cost
spanning-tree guard
spanning-tree link-type
spanning-tree loopguard default
spanning-tree mode
spanning-tree mst configuration
spanning-tree port-priority
spanning-tree vlan
spf-interval
statistics per-entry
storm-control
switchport access vlan
switchport mode
switchport port-security
switchport port-security maximum
switchport private-vlan mapping
switchport trunk allowed vlan
switchport trunk native vlan
tacacs-server host
tacacs-server key
tacacs-server timeout
terminal monitor
timers basic (RIP)
timers bgp
timers lsa arrival
timers throttle spf
username sshkey
vrf definition
vrf forwarding
vrrp authentication

### **MODES & PROMPTS**

Cisco contends that the following modes and prompts are protectable elements of Cisco's user interface as collections of modes and prompts associated with specific operating systems, identified below as IOS, IOS-XR, IOS-XE, and NX-OS. As set forth in Cisco's analytic dissection brief, Cisco's user interface provides a selection of modes that permit greater or fewer command expressions based on operator status. For example, a user who has entered "Privilege EXEC" mode will have access to different commands than a user who is in "User EXEC" mode. Different modes are indicated by different textual titles and different textual prompts that appear on the screen (*e.g.*, "(config-if)#" or "(config)#"). These prompts are used to indicate to a user which mode he or she is in, and thus which commands the user has access to. Cisco engineers could have chosen different combinations of modes and prompts. As Cisco stated in its opposition to Arista's motion for partial summary judgment (Dkt. 372 at 18-21), Cisco claims protection not in individual modes and prompts in isolation, but rather the particular arrangement of modes and prompts in Cisco's user interface, which are components of Cisco's distinctive user interface.

### **IOS**

<b>Mode</b>	<b>Prompt</b>
User EXEC	>
Privileged EXEC	#
Global Configuration	(config)#
Interface Configuration	(config-if)#

IOS-XR

Mode	Prompt
User EXEC	>
Privileged EXEC	#
Global Configuration	(config)#
Interface Configuration	(config-if)#

IOS-XE

Mode	Prompt
User EXEC	>
Privileged EXEC	#
Global Configuration	(config)#
Interface Configuration	(config-if)#

NX-OS

Mode	Prompt
User EXEC	>
EXEC	#
Privileged EXEC	#
Global Configuration	(config)#
Interface Configuration	(config-if)#

## **HIERARCHIES**

Cisco contends that the following multiword command hierarchies are protectable elements of Cisco's user interface as individual command hierarchies with a specific structure and organization as well as collections of hierarchies associated with specific operating systems, identified below as IOS, IOS-XR, IOS-XE, and NX-OS. As reflected in the tables below, some command hierarchies appear in more than one Cisco operating system. As set forth in Cisco's analytic dissection brief, each multiword command expression reflects Cisco's creation of specific multi-level textual hierarchies from which the multiword commands are constructed. Cisco engineers made their own subjective decisions on arranging their multiword commands in a distinct hierarchical fashion. Cisco has illustrated the command hierarchies in the following tables in order to illustrate to the Court the relationship between the commands and show how they are sequenced, structured, and organized into hierarchies. Further, the Court held in its summary judgment order that: "The Ninth Circuit has held that a computer program's structure, sequence, and organization are copyrightable. *Johnson Controls, Inc. v. Phoenix Control Sys, Inc.*, 886 F.2d 1173, 1175-76 (9th Cir. 1989). Here, Cisco is not attempting to claim a copyright on the generic idea of a hierarchy but rather the unique sequence in which it organizes its multi-word commands. *See Atari Games Corp. v. Nintendo of Am. Inc.*, 975 F.2d 832, 840 (Fed. Cir. 1992) (applying Ninth Circuit law)." Dkt. 482 at 14-15.

## **“aaa” hierarchies**

### IOS

```
aaa
  aaa accounting
    aaa accounting dot1x
  aaa authentication login
  aaa authorization
    aaa authorization config- commands
    aaa authorization console
  aaa group
    aaa group server radius
    aaa group server tacacs+
```

### IOS-XR

```
aaa
  aaa accounting
  aaa authentication login
  aaa group
    aaa group server radius
    aaa group server tacacs+
```

IOS-XE

```
aaa
  aaa accounting
    aaa accounting dot1x
  aaa authentication login
  aaa authorization
    aaa authorization config- commands
    aaa authorization console
  aaa group
    aaa group server radius
    aaa group server tacacs+
```

NX-OS

```
aaa
  aaa accounting dot1x
  aaa group server
    aaa group server radius
    aaa group server tacacs+
```



## **“bgp” hierarchies**

### IOS

```
bgp
  bgp client-to-client reflection
  bgp cluster-id
  bgp confederation
    bgp confederation identifier
    bgp confederation peers
  bgp listen limit
  bgp log-neighbor-changes
  bgp redistribute-internal
```

### IOS-XR

```
bgp
  bgp client-to-client reflection
  bgp cluster-id
  bgp confederation
    bgp confederation identifier
    bgp confederation peers
  bgp log-neighbor-changes
  bgp redistribute-internal
```

IOS-XE

```
bgp
  bgp client-to-client reflection
  bgp cluster-id
  bgp confederation
    bgp confederation identifier
    bgp confederation peers
  bgp listen limit
  bgp log-neighbor-changes
  bgp redistribute-internal
```

NX-OS

```
bgp
  bgp confederation peers
  bgp log-neighbor-changes
```

**“clear” hierarchies**

IOS

```
clear
  clear arp-cache
  clear counters
  clear ip
    clear ip bgp
    clear ip igmp group
    clear ip mroute
    clear ip msdp sa-cache
    clear ip nat translation
    clear ip ospf neighbor
  clear ipv6
    clear ipv6 neighbors
    clear ipv6 ospf force-spf
  clear lldp
    clear lldp counters
    clear lldp table
  clear mac-address-table dynamic
```

IOS-XR

```
clear
  clear arp-cache
  clear counters
  clear ipv6 neighbors
  clear lldp
    clear lldp counters
    clear lldp table
```

IOS-XE

```
clear
  clear arp-cache
  clear counters
  clear ip
    clear ip bgp
    clear ip igmp group
    clear ip mroute
    clear ip msdp sa-cache
    clear ip nat translation
  clear ipv6
    clear ipv6 neighbors
    clear ipv6 ospf force-spf
  clear lldp
    clear lldp counters
    clear lldp table
```

## NX-OS

```
clear
  clear counters
  clear ip
    clear ip arp
    clear ip bgp
    clear ip mroute
    clear ip msdp sa-cache
    clear ip ospf neighbor
  clear ipv6 neighbors
  clear mac-address-table dynamic
  clear spanning-tree counters
```

## **“dot1x” hierarchies**

## IOS

```
dot1x
  dot1x max-reauth-req
  dot1x pae authenticator
  dot1x port-control
  dot1x reauthentication
  dot1x system-auth-control
  dot1x timeout
    dot1x timeout quiet-period
    dot1x timeout reauth-period
    dot1x timeout tx-period
```

IOS-XE

```
dot1x
    dot1x max-reauth-req
    dot1x pae authenticator
    dot1x port-control
    dot1x reauthentication
    dot1x system-auth-control
    dot1x timeout
        dot1x timeout quiet-period
        dot1x timeout reauth-period
        dot1x timeout tx-period
```

NX-OS

```
dot1x
    dot1x max-reauth-req
    dot1x pae authenticator
    dot1x port-control
    dot1x reauthentication
    dot1x system-auth-control
    dot1x timeout
        dot1x timeout quiet-period
        dot1x timeout reauth-period
        dot1x timeout tx-period
```

## **“ip” hierarchies**

### IOS

```
ip
  ip access-
    ip access-group
    ip access-list
      ip access-list standard
  ip address
  ip as-path access-list
  ip community-list
    ip community-list expanded
    ip community-list standard
  ip dhcp
    ip dhcp smart-relay
    ip dhcp snooping
      ip dhcp snooping information option
    ip dhcp snooping vlan
  ip domain
    ip domain lookup
    ip domain name
  ip extcommunity-list
    ip extcommunity-list expanded
    ip extcommunity-list standard
  ip helper-address
  ip host
  ip http client source-interface
  ip icmp redirect
  ip igmp
    ip igmp last-member-query-
```

```
        ip igmp last-member-query- count
        ip igmp last-member-query- interval
    ip igmp query-
        ip igmp query-interval
        ip igmp query-max-response- time
    ip igmp snooping
        ip igmp snooping querier
        ip igmp snooping vlan
            ip igmp snooping vlan immediate-leave
            ip igmp snooping vlan mrouter
            ip igmp snooping vlan static
        ip igmp static-group
    ip igmp version
ip load-sharing
ip local-proxy-arp
ip msdp
    ip msdp cache-sa-state
    ip msdp default-peer
    ip msdp description
    ip msdp keepalive
    ip msdp mesh-group
    ip msdp originator-id
    ip msdp peer
    ip msdp sa-filter
        ip msdp sa-filter in
        ip msdp sa-filter out
    ip msdp sa-limit
    ip msdp shutdown
    ip msdp timer
ip multicast
    ip multicast boundary
    ip multicast-routing
ip name-server
```



```
ip nat
  ip nat pool
  ip nat translation
    ip nat translation tcp-timeout
    ip nat translation udp-timeout
ip ospf
  ip ospf authentication
    ip ospf authentication-key
  ip ospf bfd
  ip ospf cost
  ip ospf dead-interval
  ip ospf hello-interval
  ip ospf message-digest-key
  ip ospf name-lookup
  ip ospf network
  ip ospf priority
  ip ospf retransmit-interval
  ip ospf shutdown
  ip ospf transmit-delay
ip pim
  ip pim bfd
  ip pim bsr-
    ip pim bsr-border
    ip pim bsr-candidate
  ip pim dr-priority
  ip pim log-neighbor-changes
  ip pim neighbor-filter
  ip pim query-interval
  ip pim register-source
  ip pim rp-
    ip pim rp-address
    ip pim rp-candidate
  ip pim sparse-mode
```

```
    ip pim spt-threshold
        ip pim spt-threshold group-list
    ip pim ssm range
    ip prefix-list
ip protocol
ip proxy-arp
ip radius source-interface
ip rip v2-broadcast
ip route
ip routing
ip tacacs source-interface
ipv6 access-list
```

### IOS-XR

```
ip
    ip access-list
    ip address
    ip as-path access-list
    ip domain lookup
    ip helper-address
    ip host
    ip multicast-routing
    ip ospf
        ip ospf cost
        ip ospf message-digest-key
    ip pim
        ip pim rp-address
        ip pim sparse-mode
        ip pim spt-threshold
    ip prefix-list
    ipv6 access-list
```

IOS-XE

```
ip
  ip access-
    ip access-group
    ip access-list
      ip access-list standard
  ip address
  ip as-path access-list
  ip community-list
    ip community-list expanded
    ip community-list standard
  ip dhcp smart-relay
    ip dhcp smart-relay global
  ip dhcp snooping
    ip dhcp snooping information option
    ip dhcp snooping vlan
  ip domain
    ip domain lookup
    ip domain name
  ip extcommunity-list
    ip extcommunity-list expanded
    ip extcommunity-list standard
  ip helper-address
  ip host
  ip http client source-interface
  ip icmp redirect
  ip igmp
    ip igmp last-member-query-
      ip igmp last-member-query- count
      ip igmp last-member-query- interval
```

```
ip igmp query-
    ip igmp query-interval
    ip igmp query-max-response- time
ip igmp snooping
    ip igmp snooping querier
    ip igmp snooping vlan
        ip igmp snooping vlan immediate-leave
        ip igmp snooping vlan mrouter
        ip igmp snooping vlan static
ip igmp static-group
ip igmp version
ip load-sharing
ip local-proxy-arp
ip msdp
    ip msdp cache-sa-state
    ip msdp default-peer
    ip msdp description
    ip msdp keepalive
    ip msdp mesh-group
    ip msdp originator-id
    ip msdp peer
    ip msdp sa-
        ip msdp sa-filter in
        ip msdp sa-filter out
    ip msdp sa-limit
    ip msdp shutdown
    ip msdp timer
ip multicast
    ip multicast boundary
    ip multicast-routing
ip name-server
ip nat
    ip nat pool
```

```
    ip nat translation
        ip nat translation tcp-timeout
        ip nat translation udp-timeout
ip ospf
    ip ospf authentication
        ip ospf authentication-key
    ip ospf bfd
    ip ospf cost
    ip ospf dead-interval
    ip ospf hello-interval
    ip ospf message-digest-key
    ip ospf name-lookup
    ip ospf network
    ip ospf priority
    ip ospf retransmit-interval
    ip ospf shutdown
    ip ospf transmit-delay
ip pim
    ip pim bsr-
        ip pim bsr-border
        ip pim bsr-candidate
    ip pim dr-priority
    ip pim log-neighbor-changes
    ip pim neighbor-filter
    ip pim query-interval
    ip pim register-source
    ip pim rp-
        ip pim rp-address
        ip pim rp-candidate
    ip pim sparse-mode
    ip pim spt-threshold
    ip pim ssm range
ip prefix-list
```

```
ip proxy-arp
ip radius source-interface
ip rip v2-broadcast
ip route
ip routing
ip tacacs source-interface
ipv6 access-list
```

### NX-OS

```
ip
  ip access-
    ip access-group
    ip access-list
      ip access-list standard
  ip address
  ip as-path access-list
  ip community-list
    ip community-list expanded
    ip community-list standard
  ip dhcp smart-relay
    ip dhcp smart-relay global
  ip dhcp snooping
    ip dhcp snooping information option
    ip dhcp snooping vlan
  ip domain
    ip domain lookup
    ip domain name
  ip extcommunity-list
    ip extcommunity-list expanded
    ip extcommunity-list standard
  ip host
```

```
ip igmp
    ip igmp last-member-query- count
    ip igmp query-
        ip igmp query-interval
        ip igmp query-max-response- time
    ip igmp snooping
        ip igmp snooping querier
    ip igmp startup-query-
        ip igmp startup-query-interval
        ip igmp startup-query-count
    ip igmp version
ip local-proxy-arp
ip msdp
    ip msdp description
    ip msdp group-limit
    ip msdp keepalive
    ip msdp mesh-group
    ip msdp originator-id
    ip msdp peer
    ip msdp sa-limit
    ip msdp shutdown
ip name-server
ip ospf
    ip ospf authentication
        ip ospf authentication-key
    ip ospf bfd
    ip ospf cost
    ip ospf dead-interval
    ip ospf hello-interval
    ip ospf message-digest-key
    ip ospf network
    ip ospf priority
    ip ospf retransmit-interval
```

```
    ip ospf shutdown
    ip ospf transmit-delay
ip pim
    ip pim anycast-rp
    ip pim bfd
        ip pim bfd-instance
    ip pim bsr-candidate
    ip pim dr-priority
    ip pim log-neighbor-changes
    ip pim register-source
    ip pim rp-
        ip pim rp-address
        ip pim rp-candidate
    ip pim sparse-mode
    ip pim ssm range
ip prefix-list
ip proxy-arp
ip radius source-interface
ip route
ip routing
ip tacacs source-interface
ipv6 access-list
```

### **“ipv6” hierarchies**

#### IOS

```
ipv6
    ipv6 address
    ipv6 dhcp relay destination
    ipv6 enable
    ipv6 host
```



```

ipv6 ipv6 access-group
ipv6 nd
    ipv6 nd managed-config-flag
    ipv6 nd ns-interval
    ipv6 nd other-config-flag
    ipv6 nd prefix
    ipv6 nd ra
        ipv6 nd ra interval
        ipv6 nd ra lifetime
        ipv6 nd ra suppress
    ipv6 nd reachable-time
    ipv6 nd router-preference
ipv6 neighbor
ipv6 ospf
    ipv6 ospf area
    ipv6 ospf cost
ipv6 ospf
    ipv6 ospf dead-interval
    ipv6 ospf hello-interval
    ipv6 ospf network
    ipv6 ospf priority
    ipv6 ospf retransmit-interval
    ipv6 ospf transmit-delay
ipv6 prefix-list
ipv6 route
ipv6 router ospf
ipv6 unicast-routing

```

### IOS-XR

```

ipv6
    ipv6 address

```

```
ipv6 enable
ipv6 ipv6 access-group
ipv6 nd
    ipv6 nd managed-config-flag
    ipv6 nd ns-interval
    ipv6 nd other-config-flag
    ipv6 nd prefix
    ipv6 nd ra
        ipv6 nd ra interval
        ipv6 nd ra lifetime
    ipv6 nd reachable-time
ipv6 neighbor
ipv6 prefix-list
```

IOS-XE

```
ipv6
    ipv6 address
    ipv6 dhcp relay destination
    ipv6 enable
    ipv6 host
    ipv6 ipv6 access-group
    ipv6 nd
        ipv6 nd managed-config-flag
        ipv6 nd ns-interval
        ipv6 nd other-config-flag
        ipv6 nd prefix
        ipv6 nd ra
            ipv6 nd ra interval
            ipv6 nd ra lifetime
            ipv6 nd ra suppress
        ipv6 nd reachable-time
```

- ipv6 nd router-preference
- ipv6 neighbor
- ipv6 ospf
  - ipv6 ospf area
  - ipv6 ospf cost
  - ipv6 ospf dead-interval
  - ipv6 ospf hello-interval
  - ipv6 ospf network
  - ipv6 ospf priority
  - ipv6 ospf retransmit-interval
  - ipv6 ospf transmit-delay
- ipv6 prefix-list
- ipv6 route
- ipv6 router ospf
- ipv6 unicast-routing

### NX-OS

- ipv6
  - ipv6 address
  - ipv6 host
  - ipv6 nd
    - ipv6 nd managed-config-flag
    - ipv6 nd ns-interval
    - ipv6 nd other-config-flag
    - ipv6 nd prefix
    - ipv6 nd ra
      - ipv6 nd ra interval
      - ipv6 nd ra lifetime
    - ipv6 nd reachable-time
  - ipv6 neighbor
  - ipv6 prefix-list

ipv6 route  
ipv6 unicast-routing

### **“neighbor” hierarchies**

#### IOS

neighbor  
    neighbor activate  
    neighbor allowas-in  
    neighbor default-originate  
    neighbor description  
    neighbor ebgp-multihop  
    neighbor fall-over bfd  
    neighbor local-as  
    neighbor next-hop-self  
    neighbor password  
    neighbor peer-group  
    neighbor remote-as  
    neighbor remove-private-as  
    neighbor route-  
        neighbor route-map  
        neighbor route-reflector- client  
    neighbor send-community  
    neighbor shutdown  
    neighbor soft-reconfiguration  
    neighbor timers  
    neighbor transport connection-mode  
    neighbor update-source  
    neighbor weight

IOS-XR

```
neighbor ebgp-multihop
neighbor password
```

IOS-XE

```
neighbor
  neighbor activate
  neighbor allowas-in
  neighbor default-originate
  neighbor description
  neighbor ebgp-multihop
  neighbor fall-over bfd
  neighbor local-as
  neighbor next-hop-self
  neighbor password
  neighbor peer-group
  neighbor remote-as
  neighbor remove-private-as
  neighbor route-
    neighbor route-map
    neighbor route-reflector-client
  neighbor send-community
  neighbor shutdown
  neighbor soft-reconfiguration
  neighbor timers
  neighbor update-source
  neighbor weight
```

NX-OS

```
neighbor
  neighbor ebgp-multihop
  neighbor next-hop-self
  neighbor remote-as
  neighbor route-
    neighbor route-map
    neighbor route-reflector-client
  neighbor send-community
  neighbor update-source
  neighbor weight
```

**“show” hierarchies**

IOS

```
show
  show aaa
    show aaa method-lists
    show aaa sessions
  show arp
  show bfd neighbors
  show clock
  show dot1q-tunnel
  show dot1x
    show dot1x all summary
    show dot1x statistics
  show environment
    show environment all
```

```
show environment cooling
show environment power
show environment temperature
show etherchannel
show hosts
show interfaces
    show interfaces capabilities
    show interfaces description
    show interfaces flowcontrol
    show interfaces private-vlan mapping
    show interfaces status
    show interfaces switchport
        show interfaces switchport backup
    show interfaces transceiver
    show interfaces trunk
show inventory
show ip
    show ip access-lists
    show ip arp
    show ip bgp
        show ip bgp community
        show ip bgp neighbors
        show ip bgp paths
        show ip bgp peer-group
        show ip bgp regexp
        show ip bgp summary
    show ip community-list
    show ip dhcp snooping
    show ip extcommunity-list
    show ip helper-address
    show ip igmp
        show ip igmp groups
        show ip igmp interface
```

```
show ip igmp snooping
    show ip igmp snooping groups
    show ip igmp snooping mrouter
    show ip igmp snooping querier
show ip interface
    show ip interface brief
show ip mfib
show ip mroute
    show ip mroute count
show ip msdp
    show ip msdp peer
    show ip msdp rp-peer
    show ip msdp sa-cache
    show ip msdp summary
show ip nat translations
show ip ospf
    show ip ospf border-routers
    show ip ospf database database-summary
    show ip ospf interface
    show ip ospf neighbor
    show ip ospf request-list
    show ip ospf retransmission-list
show ip pim
    show ip pim interface
    show ip pim neighbor
    show ip pim rp
    show ip pim rp-hash
show ip prefix-list
show ip rip
    show ip rip database
    show ip rip neighbors
show ip route
    show ip route summary
```



```
show ip route tag
show ipv6
  show ipv6 access-list
  show ipv6 bgp community
  show ipv6 interface
  show ipv6 neighbors
  show ipv6 ospf
    show ipv6 ospf border-routers
    show ipv6 ospf interface
    show ipv6 ospf neighbor
  show ipv6 prefix-list
  show ipv6 route
    show ipv6 route summary
    show ipv6 route tag
show isis
  show isis database
  show isis topology
show link state group
show lldp
  show lldp neighbors
  show lldp traffic
show mac
  show mac access-list
  show mac address-table
    show mac address-table aging time
show module
show monitor session
show ntp
  show ntp associations
  show ntp status
show policy-map
  show policy-map control-plane
  show policy-map interface
```

```
show port-security
    show port-security address
show privilege
show redundancy states
show reload
show route-map
show snmp
    show snmp chassis
    show snmp community
    show snmp contact
    show snmp engineID
    show snmp group
    show snmp host
    show snmp location
    show snmp mib
    show snmp user
    show snmp view
show spanning-tree
    show spanning-tree mst
    show spanning-tree mst configuration
show storm-control
show tacacs
show track
show version
show vlan
show vrf
show vrrp
```

IOS-XR

```
show
  show arp
  show clock
  show environment
    show environment all
    show environment power
    show environment temperature
  show hosts
  show interfaces
  show inventory
  show ip
    show ip bgp
    show ip interface
      show ip interface brief
    show ip ospf
    show ip route
  show ipv6
    show ipv6 access-list
    show ipv6 interface
    show ipv6 neighbors
    show ipv6 prefix-list
  show isis
    show isis database
    show isis interface
    show isis topology
  show lacp counters
  show lldp
```

```
show lldp neighbors
show lldp traffic
show module
show monitor session
show ntp
    show ntp associations
    show ntp status
show policy-map interface
show radius
show redundancy states
show snmp
    show snmp engineID
    show snmp group
    show snmp host
    show snmp mib
    show snmp user
    show snmp view
show spanning-tree mst
    show spanning-tree mst configuration
    show spanning-tree mst interface
show tacacs
show track
show version
show vlan
show vrf
show vrrp
```

IOS-XE

```
show
    show aaa
        show aaa method-lists
```

```
show aaa sessions
show arp
show bfd neighbors
show clock
show dot1x
    show dot1x statistics
show environment
    show environment all
    show environment cooling
    show environment temperature
show etherchannel
show hosts
show interfaces
    show interfaces capabilities
    show interfaces description
    show interfaces flowcontrol
    show interfaces private-vlan mapping
    show interfaces status
    show interfaces switchport
        show interfaces switchport backup
    show interfaces transceiver
    show interfaces trunk
show inventory
show ip
    show ip access-lists
    show ip arp
    show ip bgp
        show ip bgp community
        show ip bgp neighbors
        show ip bgp neighbors
        show ip bgp paths
        show ip bgp peer-group
        show ip bgp regexp
```

```
show ip bgp summary
show ip community-list
show ip dhcp snooping
show ip extcommunity-list
show ip helper-address
show ip igmp
    show ip igmp groups
    show ip igmp interface
    show ip igmp snooping
        show ip igmp snooping groups
        show ip igmp snooping mrouter
show ip interface
    show ip interface brief
show ip mfib
show ip mroute
    show ip mroute count
show ip msdp
    show ip msdp peer
    show ip msdp rpf-peer
    show ip msdp sa-cache
    show ip msdp summary
show ip nat translations
show ip ospf
    show ip ospf border-routers
    show ip ospf database database-summary
    show ip ospf interface
    show ip ospf neighbor
    show ip ospf request-list
    show ip ospf retransmission-list
show ip pim
    show ip pim interface
    show ip pim neighbor
    show ip pim rp
```

```
        show ip pim rp-hash
    show ip prefix-list
    show ip rip
        show ip rip database
        show ip rip neighbors
    show ip route
        show ip route summary
show ipv6
    show ipv6 access-list
    show ipv6 interface
    show ipv6 neighbors
    show ipv6 ospf
        show ipv6 ospf border- routers
        show ipv6 ospf interface
        show ipv6 ospf neighbor
    show ipv6 prefix-list
    show ipv6 route
        show ipv6 route summary
show isis
    show isis database
    show isis topology
show lacp counters
show link state group
show lldp
    show lldp neighbors
    show lldp traffic
show mac
    show mac access-list
    show mac address-table
        show mac address-table aging time
        show mac address-table count
show module
show monitor session
```

```
show ntp
    show ntp associations
    show ntp status
show policy-map
    show policy-map control-plane
    show policy-map interface
show port-security
    show port-security address
    show port-security interface
show privilege
show redundancy states
show reload
show route-map
show snmp
    show snmp chassis
    show snmp community
    show snmp contact
    show snmp engineID
    show snmp group
    show snmp host
    show snmp location
    show snmp mib
    show snmp user
    show snmp view
show spanning-tree
    show spanning-tree mst
        show spanning-tree mst configuration
show storm-control
show tacacs
show track
show version
show vlan
show vrf
```



```
show vrrp
```

NX-OS

```
show
  show arp
  show bfd neighbors
  show clock
  show dot1q-tunnel
  show dot1x
    show dot1x all summary
  show environment power
  show hostname
  show hosts
  show interfaces
    show interfaces capabilities
    show interfaces description
    show interfaces private-vlan mapping
    show interfaces status
    show interfaces switchport
    show interfaces transceiver
    show interfaces trunk
  show inventory
  show ip
    show ip access-lists
    show ip arp
    show ip bgp
      show ip bgp community
      show ip bgp neighbors
    show ip community-list
    show ip dhcp snooping
    show ip extcommunity-list
```

```
show ip igmp
    show ip igmp groups
    show ip igmp interface
    show ip igmp snooping
        show ip igmp snooping groups
        show ip igmp snooping mrouter
        show ip igmp snooping querier
show ip interface
show ip mroute
show ip msdp
    show ip msdp mesh-group
    show ip msdp peer
    show ip msdp sa-cache
    show ip msdp summary
show ip ospf
    show ip ospf border-routers
    show ip ospf database database-summary
    show ip ospf interface
    show ip ospf neighbor
    show ip ospf request-list
    show ip ospf retransmission-list
show ip pim
    show ip pim interface
    show ip pim neighbor
    show ip pim rp
    show ip pim rp-hash
show ip prefix-list
show ip rip neighbors
show ip route
show ip route summary
show ipv6
    show ipv6 access-list
    show ipv6 bgp
```

```
        show ipv6 bgp community
        show ipv6 bgp neighbors
        show ipv6 bgp summary
    show ipv6 interface
    show ipv6 neighbors
    show ipv6 prefix-list
    show ipv6 route
        show ipv6 route summary
show isis
    show isis database
    show isis interface
    show isis topology
show lacp
    show lacp counters
    show lacp interface
    show lacp neighbor
show lldp
    show lldp neighbors
    show lldp traffic
show mac
    show mac access-list
    show mac address-table
        show mac address-table aging time
        show mac address-table count
show module
show monitor session
show ntp status
show policy-map
    show policy-map control-plane
    show policy-map interface
        show policy-map interface control-plane
show port-channel
    show port-channel summary
```

```
show port-channel traffic
show port-security
    show port-security address
    show port-security interface
show privilege
show ptp
    show ptp clock
    show ptp parent
    show ptp time-property
show radius
show role
show route-map
show snmp
    show snmp community
    show snmp engineID
    show snmp group
    show snmp host
    show snmp source-interface
    show snmp trap
    show snmp user
show spanning-tree
    show spanning-tree blockedports
    show spanning-tree bridge
    show spanning-tree interface
    show spanning-tree mst
        show spanning-tree mst configuration
        show spanning-tree mst interface
    show spanning-tree root
show tacacs
show track
show user-account
show version
show vlan
```

```
show vlan private-vlan
show vlan summary
show vrf
show vrrp
```

### **“snmp-server” hierarchies**

#### IOS

```
snmp-server
  snmp-server chassis-id
  snmp-server community
  snmp-server contact
  snmp-server enable traps
  snmp-server engineID
    snmp-server engineID local
    snmp-server engineID remote
  snmp-server group
  snmp-server host
  snmp-server location
  snmp-server source-interface
  snmp-server user
  snmp-server view
```

#### IOS-XR

```
snmp-server
  snmp-server chassis-id
  snmp-server community
  snmp-server contact
  snmp-server enable traps
```

```
snmp-server engineID
    snmp-server engineID local
    snmp-server engineID remote
snmp-server group
snmp-server host
snmp-server location
snmp-server user
snmp-server view
```

### IOS-XE

```
snmp-server
    snmp-server chassis-id
    snmp-server community
    snmp-server contact
    snmp-server enable traps
    snmp-server engineID
        snmp-server engineID local
        snmp-server engineID remote
    snmp-server group
    snmp-server host
    snmp-server location
    snmp-server source-interface
    snmp-server user
    snmp-server view
```

### NX-OS

```
snmp-server
    snmp-server community
    snmp-server contact
```

snmp-server enable traps  
snmp-server host  
snmp-server location  
snmp-server user

### **“spanning-tree” hierarhcies**

#### IOS

spanning-tree  
    spanning-tree bp  
        spanning-tree bpdudfilter  
        spanning-tree bpduguard  
    spanning-tree cost  
    spanning-tree guard  
    spanning-tree link-type  
    spanning-tree loopguard default  
    spanning-tree mode  
    spanning-tree mst configuration  
    spanning-tree portfast  
        spanning-tree portfast bpdudfilter default  
        spanning-tree portfast bpduguard default  
    spanning-tree port-priority  
    spanning-tree transmit hold- count  
    spanning-tree vlan

#### IOS-XE

spanning-tree  
    spanning-tree mst configuration  
    spanning-tree vlan

NX-OS

```
spanning-tree
  spanning-tree bp
    spanning-tree bpduguard
  spanning-tree bridge assurance
  spanning-tree cost
  spanning-tree guard
  spanning-tree link-type
  spanning-tree loopguard default
  spanning-tree mode
  spanning-tree mst configuration
  spanning-tree port-priority
  spanning-tree vlan
```

**“vrrp” hierarchies**

IOS

```
vrrp
  vrrp authentication
  vrrp delay reload
  vrrp description
  vrrp ip
    vrrp ip secondary
  vrrp preempt
  vrrp priority
  vrrp shutdown
  vrrp timers advertise
```



IOS-XR

```
vrrp
  vrrp delay reload
  vrrp ip
  vrrp preempt
  vrrp priority
```

IOS-XE

```
vrrp
  vrrp authentication
  vrrp delay reload
  vrrp description
  vrrp ip
    vrrp ip secondary
  vrrp preempt
  vrrp priority
  vrrp shutdown
  vrrp timers advertise
```

NX-OS

```
vrrp
  vrrp authentication
```

## **COMMAND RESPONSES**

Cisco contends that the following command responses (also referred to as command outputs) are protectable elements of Cisco's user interface both individually and as a collection of outputs associated with specific operating systems, identified below as IOS and NX-OS. For the avoidance of doubt, where a red box is used to highlight text below, the text within the red box is what Cisco claims to be protectable. As set forth in Cisco's analytic dissection brief, once a multi-word command expression is input by an operator, the switch or router analyzes the command and responds by displaying textual screen outputs on the computer screen. Each of the copied text portions from these screen outputs could have been written and sequenced in a different way.

### **IOS**

Switch(config)#help

Help may be requested at any point in a command by entering a question mark '?'. If nothing matches, the help list will be empty and you must backup until entering a '?' shows the available options.

Two styles of help are provided:

1. Full help is available when you are ready to enter a command argument (e.g. 'show ?') and describes each possible argument
2. Partial help is provided when an abbreviated argument is entered and you want to know what arguments match the input (e.g. 'show pr?'.)

```

Switch#show snmp
Chassis: CAT1552S66E
0 SNMP packets input
    0 Bad SNMP version errors
    0 Unknown community name
    0 Illegal operation for community name supplied
    0 Encoding errors
    0 Number of requested variables
    0 Number of altered variables
    0 Get-request PDUs
    0 Get-next PDUs
    0 Set-request PDUs
    0 Input queue packet drops (Maximum queue size 1000)
0 SNMP packets output
    0 Too big errors (Maximum packet size 1500)
    0 No such name errors
    0 Bad values errors
    0 General errors
    0 Response PDUs
    0 Trap PDUs
SNMP global trap: disabled
SNMP agent enabled

```

```

Switch#show ip route
Codes: C - connected, S - static, R - RIP, M - mobile, B - BGP
       D - EIGRP, EX - EIGRP external, O - OSPF, IA - OSPF inter area
       N1 - OSPF NSSA external type 1, N2 - OSPF NSSA external type 2
       E1 - OSPF external type 1, E2 - OSPF external type 2
       i - IS-IS, su - IS-IS summary, L1 - IS-IS level-1, L2 - IS-IS level-2
       ia - IS-IS inter area, * - candidate default, U - per-user static route
       o - ODR, P - periodic downloaded static route

Gateway of last resort is not set

```

```
Switch#show ip igmp snooping
Global IGMP Snooping configuration:
```

```
-----
IGMP snooping           : Enabled
IGMPv3 snooping         : Enabled
Report suppression      : Enabled
TCN solicit query       : Disabled
TCN flood query count    : 2
Last Member Query Interval : 1000
```

```
Vlan 1:
```

```
-----
IGMP snooping           : Enabled
CAPWAP enabled          : Disabled
IGMPv2 immediate leave   : Disabled
Explicit host tracking    : Enabled
Multicast router learning mode : pim-dvmrp
CGMP interoperability mode : IGMP_ONLY
Last Member Query Interval : 1000
```

```

Switch#show interfaces FastEthernet 1
FastEthernet1 is down, line protocol is down
  Hardware is Fast Ethernet for out of band management, address is c464.1342.efbf (bia
c464.1342.efbf)
  Internet address is 10.1.1.35/24
  MTU 1500 bytes, BW 100000 Kbit, DLY 100 usec,
    reliability 255/255, txload 1/255, rxload 1/255
  Encapsulation ARPA, loopback not set
  Keepalive set (10 sec)
  Unknown duplex, Unknown Speed, 100BaseTX/FX
  ARP type: ARPA, ARP Timeout 04:00:00
  Last input never, output never, output hang never
  Last clearing of "show interface" counters never
  Input queue: 0/75/0/0 (size/max/drops/flushes); Total output drops: 0
  Queueing strategy: fifo
  Output queue: 0/40 (size/max)
  5 minute input rate 0 bits/sec, 0 packets/sec
  5 minute output rate 0 bits/sec, 0 packets/sec
    0 packets input, 0 bytes
    Received 0 broadcasts (0 IP multicasts)
    0 runs, 0 giants, 0 throttles
    0 input errors, 0 CRC, 0 frame, 0 overrun, 0 ignored
    0 watchdog
    0 input packets with dribble condition detected
    0 packets output, 0 bytes, 0 underruns
    0 output errors, 0 collisions, 2 interface resets
    0 babbles, 0 late collision, 0 deferred
    0 lost carrier, 0 no carrier
    0 output buffer failures, 0 output buffers swapped out

```

**Command Examples** This example shows the output from the `show port-security` command when you do not enter any options:

```

Router# show port-security
Secure Port      MaxSecureAddr  CurrentAddr  SecurityViolation  Security
Action          (Count)       (Count)      (Count)
-----
Fa5/1            11             11           0                  Shutdown
Fa5/5            15             5            0                  Restrict
Fa5/11           5              4            0                  Protect

```

```

Total Addresses in System: 21
Max Addresses limit in System: 128
Router#

```

Cisco IOS Security Command Reference Commands S to Z, IOS 15.2, at 692

```

Router# show interface cbr 6/0
CBR6/0 is up, line protocol is up
Hardware is DCU
MTU 0 bytes, BW 1544 Kbit, DLY 0 usec, rely 255/255, load 248/255
Encapsulation ET ATMCES T1, loopback not set
Last input 00:00:00, output 00:00:00, output hang never
Last clearing of "show interface" counters never
Queueing strategy: fifo
Output queue 0/0, 0 drops; input queue 0/75, 0 drops
5 minute input rate 1507000 bits/sec, 3957 packets/sec
5 minute output rate 1507000 bits/sec, 3955 packets/sec
 3025960 packets input, 142220120 bytes, 0 no buffer
Received 0 broadcasts, 0 runts, 0 giants
 0 input errors, 0 CRC, 0 frame, 0 overrun, 0 ignored, 0 abort
 3030067 packets output, 142413149 bytes, 0 underruns
 0 output errors, 0 collisions, 0 interface resets
 0 output buffer failures, 0 output buffers swapped out

```

The table below describes the fields shown in the display.

Cisco IOS Asynchronous Transfer Mode Command Reference (2013), at 460

```

Router# show interfaces
Ethernet0/0 is up, line protocol is up
Hardware is AmdP2, address is aabb.cc03.6c00 (bia aabb.cc03.6c00)
Internet address is 172.17.1.1/16
MTU 1500 bytes, BW 10000 Kbit, DLY 1000 usec,
Reliability 255/255, txload 1/255, rxload 1/255
Encapsulation ARPA, loopback not set
Keepalive set (10 sec)
ARP type: ARPA, ARP Timeout 04:00:00
Last input never, output 00:00:06, output hang never
Last clearing of "show interface" counters never
Input queue: 0/75/0/0 (size/max/drops/flushes); Total output drops: 0
Queueing strategy: fifo
Output queue: 0/40 (size/max)
5 minute input rate 0 bits/sec, 0 packets/sec
5 minute output rate 0 bits/sec, 0 packets/sec
 0 packets input, 0 bytes, 0 no buffer
Received 0 broadcasts, 0 runts, 0 giants, 0 throttles
 0 input errors, 0 CRC, 0 frame, 0 overrun, 0 ignored
 0 input packets with dribble condition detected
11 packets output, 1648 bytes, 0 underruns
 0 output errors, 0 collisions, 1 interface resets
 0 babbles, 0 late collision, 0 deferred
 0 lost carrier, 0 no carrier
 0 output buffer failures, 0 output buffers swapped out

```

Configuration Fundamentals Configuration Guide, Cisco IOS Release 15M&T (2013), at 44

Use the `show interface interface-type interface-number` command to display the information and statistics for Ethernet 0 on R4.

```

R4> show interface ethernet 0
Ethernet0 is up, line protocol is up
Hardware is Lance, address is 00e0.1eb8.eb0e (bia 00e0.1eb8.eb0e)
The MAC address for Ethernet 0 on R4 is 00e0.1eb8.eb0e. The format of the client identifier for this interface
is nullcisco-00e0.1eb8.eb0e-et0.

```

Configuration Fundamentals Configuration Guide, Cisco IOS Release 15M&T (2013), at 81

The following is sample output from the `show ip igmp snooping` command:

```

Router# show ip igmp snooping
Global IGMP Snooping configuration:
-----
IGMP snooping                : Enabled
IGMPv3 snooping (minimal)    : Enabled
Report suppression           : Enabled
TCN solicit query             : Disabled
TCN flood query count        : 2
Last Member Query Interval   : 1000

```

Cisco IOS IP Multicast Command Reference (2013), at 626

**Examples**

This example shows how to display transceiver information:

```
Router# show interfaces transceiver
If device is externally calibrated, only calibrated values are printed.
++ : high alarm, + : high warning, - : low warning, -- : low alarm.
NA or N/A: not applicable, Tx: transmit, Rx: receive.
mA: milliamperes, dBm: decibels (milliwatts).
```

Port	Temperature (Celsius)	Voltage (Volts)	Current (mA)	Optical Tx Power (dBm)	Optical Rx Power (dBm)
Gi1/1	40.6	5.09	0.4	-25.2	N/A
Gi2/1	35.5	5.05	0.1	-29.2	N/A
Gi2/2	49.5	3.30	0.0	7.1	-18.7

Cisco IOS Interfaces and Hardware Component Command Reference (2013), at 1879

The following is sample output from the show ip ospf command when entered without a specific OSPF process ID:

```
Router# show ip ospf
Routing Process "ospf 201" with ID 10.0.0.1 and Domain ID 10.20.0.1
Supports only single TOS(TOS0) routes
Supports opaque LSA
SPF schedule delay 5 secs, Hold time between two SPFs 10 secs
Minimum LSA interval 5 secs, Minimum LSA arrival 1 secs
LSA group pacing timer 100 secs
Interface flood pacing timer 55 msec
Retransmission pacing timer 100 msec
Number of external LSA 0, Checksum Sum 0x0
Number of opaque AS LSA 0, Checksum Sum 0x0
Number of DCbitless external and opaque AS LSA 0
Number of DoNotAge external and opaque AS LSA 0
Number of areas in this router is 2. 2 normal 0 stub 0 nssa
External flood list length 0
Area BACKBONE(0)
Number of interfaces in this area is 2
Area has message digest authentication
SPF algorithm executed 4 times
Area ranges are
Number of LSA 4, Checksum Sum 0x29BEE
Number of opaque link LSA 0, Checksum Sum 0x0
Number of DCbitless LSA 3
Number of indication LSA 0
Number of DoNotAge LSA 0
Flood list length 0
Area 172.16.26.0
Number of interfaces in this area is 0
Area has no authentication
SPF algorithm executed 1 times
Area ranges are
172.16.0.0/16 Passive Advertise
Number of LSA 1, Checksum Sum 0x44FD
Number of opaque link LSA 0, Checksum Sum 0x0
Number of DCbitless LSA 1
Number of indication LSA 1
Number of DoNotAge LSA 0
Flood list length 0
```

Cisco IOS IP Routing:OSPF Command Reference (2013), at 174

**Examples**

The following is sample output from the show snmp command:

```
Router# show snmp
Chassis: 12161083
0 SNMP packets input
0 Bad SNMP version errors
0 Unknown community name
0 Illegal operation for community name supplied
0 Encoding errors
0 Number of requested variables
0 Number of altered variables
0 Get-request PDUs
0 Get-next PDUs
0 Set-request PDUs
0 Input queue packet drops (Maximum queue size 1000)
0 SNMP packets output
0 Too big errors (Maximum packet size 1500)
0 No such name errors
0 Bad values errors
0 General errors
0 Response PDUs
0 Trap PDUs
SNMP logging: enabled
SNMP trap Queue: 0 dropped due to resource failure.
```

Cisco IOS SNMP Support Command Reference (2013), at 83

```

Router# show interfaces atm 0/0/0
ATM0/0/0 is up, line protocol is up
Hardware is cyBus ATM
Internet address is 10.1.1.1/24
MTU 4470 bytes, sub MTU 4470, BW 156250 Kbit, DLY 80 usec, rely 255/255, load 1/255
Encapsulation ATM, loopback not set, keepalive set (10 sec)
Encapsulation(s): AAL5, PVC mode
256 TX buffers, 256 RX buffers,
2048 maximum active VCs, 1024 VCs per VP, 1 current VCCs
VC idle disconnect time: 300 seconds
Last input never, output 00:00:05, output hang never
Last clearing of "show interface" counters never
Queueing strategy: fifo
Output queue 0/40, 0 drops; input queue 0/75, 0 drops
5 minute input rate 0 bits/sec, 1 packets/sec
5 minute output rate 0 bits/sec, 1 packets/sec
  5 packets input, 560 bytes, 0 no buffer
    Received 0 broadcasts, 0 runs, 0 giants
    0 input errors, 0 CRC, 0 frame, 0 overrun, 0 ignored, 0 abort
  5 packets output, 560 bytes, 0 underruns
    0 output errors, 0 collisions, 0 interface resets
    0 output buffer failures, 0 output buffers swapped out

```

Cisco IOS Asynchronous Transfer Mode Command Reference (2011), at ATM-377

```
Router# show ip route
```

```

Codes: C - connected, S - static, I - IGRP, R - RIP, M - mobile, B - BGP
       D - EIGRP, EX - EIGRP external, O - OSPF, IA - OSPF inter area
       N1 - OSPF NSSA external type 1, N2 - OSPF NSSA external type 2
       E1 - OSPF external type 1, E2 - OSPF external type 2, E - EGP
       i - IS-IS, su - IS-IS summary, L1 - IS-IS level-1, L2 - IS-IS level-2
       ia - IS-IS inter area, * - candidate default, U - per-user static route
       o - ODR, P - periodic downloaded static route

```

Gateway of last resort is not set

Cisco IOS IP Routing Protocols Command Reference, Release 12.4 (2005), at IP2R-553

#### Usage Guidelines

This command provides counter information for SNMP operations. It also displays the chassis ID string defined with the `snmp-server chassis-id` global configuration command.

#### Command Examples

The following is sample output from the `show snmp` command:

```

Router# show snmp
Chassis: 12161083
0 SNMP packets input
  0 Bad SNMP version errors
  0 Unknown community name
  0 Illegal operation for community name supplied
  0 Encoding errors
  0 Number of requested variables
  0 Number of altered variables
  0 Get-request PDUs
  0 Get-next PDUs
  0 Set-request PDUs
0 Input queue packet drops (Maximum queue size 1000)
0 SNMP packets output
  0 Too big errors (Maximum packet size 1500)
  0 No such name errors
  0 Bad values errors
  0 General errors
  0 Response PDUs
  0 Trap PDUs
SNMP logging: enabled

```

Cisco IOS SNMP Support Command Reference, IOS 15.2 (2011), at 95-96

NX-OS



**Examples**

This example shows how to display VTP interface switchport information on the device:

```
switch# show interface switchport
Name: Ethernet8/11
Switchport: Enabled
Switchport Monitor: Not enabled
Operational Mode: trunk
Access Mode VLAN: 1 (default)
Trunking Native Mode VLAN: 1 (default)
Trunking VLANs Enabled: 1,10,20-30
Pruning VLANs Enabled: 2-1001
Administrative private-vlan primary host-association: none
Administrative private-vlan secondary host-association: none
Administrative private-vlan primary mapping: none
Administrative private-vlan secondary mapping: none
Administrative private-vlan trunk native VLAN: none
Administrative private-vlan trunk encapsulation: dot1q
Administrative private-vlan trunk normal VLANs: none
Administrative private-vlan trunk private VLANs: none
Operational private-vlan: none
switch#
```

Cisco Nexus 7000 Series NX-OS Layer 2 Switching Command Reference (Feb. 2013), at 44

**Examples**

This example shows how to display information about the specified VLAN. This command displays statistical information gathered on the VLAN at 1-minute intervals:

```
switch# show interface vlan 5
Vlan5 is administratively down, line protocol is down
Hardware is EtherSVI, address is 0000.0000.0000
MTU 1500 bytes, BW 1000000 Kbit, DLY 10 usec,
    reliability 255/255, txload 1/255, rxload 1/255
Encapsulation ARPA, loopback not set
Keepalive not supported
ARP type: ARPA
Last clearing of "show interface" counters 01:21:55
1 minute input rate 0 bytes/sec, 0 packets/sec
1 minute output rate 0 bytes/sec, 0 packets/sec
L3 Switched:
    input: 0 pkts, 0 bytes - output: 0 pkts, 0 bytes
L3 in Switched:
    ucast: 0 pkts, 0 bytes - mcast: 0 pkts, 0 bytes
L3 out Switched:
    ucast: 0 pkts, 0 bytes - mcast: 0 pkts, 0 bytes
```

Cisco Nexus 7000 Series NX-OS Layer 2 Switching Command Reference (Feb. 2013), at 49

**Examples**

This example shows how to display STP when you are running Rapid PVST+:

```
switch# show spanning-tree

VLAN0001
Spanning tree enabled protocol rstp
  Root ID    Priority    32769
    Address   000d.eca3.9f01
      Cost    4
      Port    4105 (port-channel10)
  Hello Time 2 sec  Max Age 20 sec  Forward Delay 15 sec

  Bridge ID  Priority    32769 (priority 32768 sys-id-ext 1)
    Address   0022.5579.7641
      Hello Time 2 sec  Max Age 20 sec  Forward Delay 15 sec

Interface Role Sts Cost Prio.Nbr Type
-----
Po10      Root FWD 2    128.4105 (VPC peer-link) P2p
Po20      Desg FWD 1    128.4115 (VPC) P2p
Po30      Root FWD 1    128.4125 (VPC) P2p
```

Cisco Nexus 7000 Series NX-OS Layer 2 Switching Command Reference (Feb. 2013), at 63

This example shows how to display STP information when you are running MST:

switch# show spanning-tree

```

MST0000
  Spanning tree enabled protocol mstp
  Root ID    Priority    32768
             Address     0018.bad8.fc150
             Cost        0
             Port        258 (Ethernet 2/2)
             Hello Time   2 sec  Max Age 20 sec  Forward Delay 15 sec

  Bridge ID  Priority    32768 (priority 32768 sys-id-ext 0)
             Address     0018.bad8.239d
             Hello Time   2 sec  Max Age 20 sec  Forward Delay 15 sec

Interface    Role Sts Cost      Prio.Nbr  Type
-----
Eth2/1       Aith BKN 20000    128.257   Network, P2p  BA_inc.
Eth2/2       Root FWD 20000    128.258   Edge, P2p
Eth3/48      Desg FWD 20000    128.43228 P2p
  
```

Cisco Nexus 7000 Series NX-OS Layer 2 Switching Command Reference (Feb. 2013), at 64

Spanning tree enabled protocol rstp

```

Root ID    Priority    32770
             Address     000d.eca3.9f01
             Cost        4
             Port        4105 (port-channel10)
             Hello Time   2 sec  Max Age 20 sec  Forward Delay 15 sec
  
```

```

Bridge ID  Priority    32770 (priority 32768 sys-id-ext 2)
             Address     0022.5579.7641
             Hello Time   2 sec  Max Age 20 sec  Forward Delay 15 sec
  
```

```

Interface    Role Sts Cost      Prio.Nbr  Type
-----
Po10         Root FWD 2        128.4105  (vPC peer-link) P2p
Po20         Desg FWD 1        128.4115  (vPC) P2p
Po30         Root FWD 1        128.4125  (vPC) P2p
  
```

Cisco Nexus 7000 Series NX-OS Layer 2 Switching Command Reference (Feb. 2013), at 73

This example shows how to display detailed information about the STP configuration:

```
switch(config)# show spanning-tree detail
```

```
VLAN0001 is executing the rstp compatible Spanning Tree protocol
Bridge Identifier has priority 32768, sysid 1, address 0022.5579.7641
Configured hello time 2, max age 20, forward delay 15
Current root has priority 32769, address 000d.eca3.9f01
Root port is 4105 (port-channel10), cost of root path is 4
Topology change flag not set, detected flag not set
Number of topology changes 1 last change occurred 20:24:36 ago
from port-channel10
Times: hold 1, topology change 35, notification 2
hello 2, max age 20, forward delay 15
Timers: hello 0, topology change 0, notification 0
```

```
Port 4105 (port-channel10, vPC Peer-link) of VLAN0001 is root forwarding
Port path cost 2, Port priority 128, Port Identifier 128.4105
Designated root has priority 32769, address 000d.eca3.9f01
Designated bridge has priority 32769, address 0022.5579.7341
Designated port id is 128.4105, designated path cost 2
Timers: message age 16, forward delay 0, hold 0
Number of transitions to forwarding state: 1
Link type is point-to-point by default
```

```
BPDU: sent 36729, received 36739
```

```
Port 4115 (port-channel20, vPC) of VLAN0001 is designated forwarding
Port path cost 1, Port priority 128, Port Identifier 128.4115
Designated root has priority 32769, address 000d.eca3.9f01
Designated bridge has priority 32769, address 0022.5579.7341
Designated port id is 128.4115, designated path cost 2
Timers: message age 0, forward delay 0, hold 0
Number of transitions to forwarding state: 0
Link type is point-to-point by default
BPDU: sent 0, received 0
```

```
Port 4125 (port-channel30, vPC) of VLAN0001 is root forwarding
Port path cost 1, Port priority 128, Port Identifier 128.4125
Designated root has priority 32769, address 000d.eca3.9f01
Designated bridge has priority 32769, address 000d.eca3.9f01
Designated port id is 128.4125, designated path cost 0
Timers: message age 0, forward delay 0, hold 0
Number of transitions to forwarding state: 0
Link type is point-to-point by default
BPDU: sent 0, received 0
```

Cisco Nexus 7000 Series NX-OS Layer 2 Switching Command Reference (Feb. 2013), at 74-75

This example shows how to display STP information about a specified interface when you are running Rapid PVST+:

```
switch(config)# show spanning-tree interface ethernet 8/2
```

Vlan	Role	Sts	Cost	Prio.Nbr	Type
VLAN0001	Altn	BLK	20000	128.1025	P2p
VLAN0002	Desg	FWD	20000	128.1025	P2p

This example shows how to display STP information about a specified interface when you are running MST:

```
switch(config)# show spanning-tree interface ethernet 2/50
```

Mst	Instance	Role	Sts	Cost	Prio.Nbr	Type
MST0000		Desg	FWD	20000	128.1281	P2p

This example shows how to display detailed STP information about a specified interface when you are running Rapid PVST+:

```
switch(config)# show spanning-tree interface ethernet 8/1 detail
```

Port 1025 (Ethernet8/1) of VLAN0001 is alternate blocking  
 Port path cost 20000, Port priority 128, Port Identifier 128.1025  
 Designated root has priority 28672, address 0018.bad8.239d  
 Designated bridge has priority 28672, address 0018.bad8.239d  
 Designated port id is 128.1281, designated path cost 0  
 Timers: message age 15, forward delay 0, hold 0  
 Number of transitions to forwarding state: 1  
 Link type is point-to-point by default  
 The port type is network by default.  
 BPDUs: sent 4657, received 188

Port 1025 (Ethernet8/1) of VLAN0002 is designated forwarding  
 Port path cost 20000, Port priority 128, Port Identifier 128.1025  
 Designated root has priority 32770, address 0018.bad7.fc15  
 Designated bridge has priority 32770, address 0018.bad7.fc15  
 Designated port id is 128.1025, designated path cost 0  
 Timers: message age 0, forward delay 0, hold 0  
 Number of transitions to forwarding state: 1  
 Link type is point-to-point by default  
 The port type is network by default.  
 BPDUs: sent 4838, received 0

Cisco Nexus 7000 Series NX-OS Layer 2 Switching Command Reference (Feb. 2013), at 77.

```
switch# show spanning-tree mst

##### MST0      vlans mapped: 1-4094
Bridge          address 0018.bad7.fc15 priority      32768 (32768 sysid 0)
Root            this switch for the CIST
Regional Root   this switch
Operational     hello time 2 , forward delay 15, max age 20, txholdcount 6
Configured      hello time 2 , forward delay 15, max age 20, max hops 20

Interface      Role Sts Cost      Prio.Nbr Type
-----
Eth8/1         Desg FWD 20000    128.1025 P2p
Eth8/2         Desg FWD 20000    128.1026 P2p
```

This example shows how to display STP information about a specific MST instance:

```
switch)# show spanning-tree mst 0

##### MST0      vlans mapped: 1-4094
Bridge          address 0018.bad7.fc15 priority      32768 (32768 sysid 0)
Root            this switch for the CIST
Regional Root   this switch
Operational     hello time 2 , forward delay 15, max age 20, txholdcount 6
Configured      hello time 2 , forward delay 15, max age 20, max hops 20

Interface      Role Sts Cost      Prio.Nbr Type
-----
Eth8/1         Desg FWD 20000    128.1025 P2p
Eth8/2         Desg FWD 20000    128.1026 P2p
```

This example shows how to display detailed STP information about the MST protocol:

```
switch)# show spanning-tree mst detail

##### MST0      vlans mapped: 1-4094
Bridge          address 0018.bad7.fc15 priority      32768 (32768 sysid 0)
Root            this switch for the CIST
Regional Root   this switch
Operational     hello time 2 , forward delay 15, max age 20, txholdcount 6
Configured      hello time 2 , forward delay 15, max age 20, max hops 20

Eth8/1 of MST0 is designated forwarding
Port info      port id 128.1025 priority 128 cost 20000
Designated root address 0018.bad7.fc15 priority 32768 cost 0
Design. regional root address 0018.bad7.fc15 priority 32768 cost 0
Designated bridge address 0018.bad7.fc15 priority 32768 port id 128.1025
Timers: message expires in 0 sec, forward delay 0, forward transitions 1
Bpdus sent 1379, received 3

Eth8/2 of MST0 is designated forwarding
Port info      port id 128.1026 priority 128 cost 20000
Designated root address 0018.bad7.fc15 priority 32768 cost 0
Design. regional root address 0018.bad7.fc15 priority 32768 cost 0
Designated bridge address 0018.bad7.fc15 priority 32768 port id 128.1026
Timers: message expires in 0 sec, forward delay 0, forward transitions 1
Bpdus sent 1380, received 2
```

Cisco Nexus 7000 Series NX-OS Layer 2 Switching Command Reference (Feb. 2013), at 80.

This example shows how to display information about the MST configuration:

```
switch)# show spanning-tree mst configuration

Name: [mst-bldg-sj6/3]
Revision: 1 Instances Configured: 3
Instance Vlans mapped
-----
0         1
2000      2-2000
4094      2001-4094
```

This example shows how to display the MD5 digest included in the current MST configuration:

```
switch)# show spanning-tree mst configuration digest

Name [mst-config]
Revision 10 Instances configured 25
Digest 0x40D5ECA178C657835C83BBBCB16723192
Pre-std Digest 0x27BF112A75B72781ED928D9EC5BB4251
```

Cisco Nexus 7000 Series NX-OS Layer 2 Switching Command Reference (Feb. 2013), at 81.

**Examples**

This example shows how to display information for the root bridge:

```
switch(config)# show spanning-tree root
```

MST Instance	Root ID	Cost	Time	Age	Dly	Root Port
MST0000	32768	0018.bad7.fc15	0	2	20	15

This bridge is root

Cisco Nexus 7000 Series NX-OS Layer 2 Switching Command Reference (Feb. 2013), at 82-83.

```
switch# show vlan summary
```

```
Number of existing VLANs           : 9
Number of existing user VLANs      : 9
Number of existing extended VLANs  : 0
```

Cisco Nexus 7000 Series NX-OS Layer 2 Switching Command Reference (Feb. 2013), at 94.

**Examples**

This example shows how to display information about all private VLANs on the device:

```
switch(config)# show vlan private-vlan
```

Primary	Secondary	Type	Ports
200	201	isolated	Eth2/26, Eth2/27
200	202	community	Eth2/26, Eth2/28

Cisco Nexus 7000 Series NX-OS Layer 2 Switching Command Reference (Feb. 2013), at 100.

```
EGP table version is 10, local router ID is 3.3.3.3
Status: s-suppressed, x-deleted, S-stale, d-dampened, h-history, *-valid, >-best
Path type: i-internal, e-external, c-confed, l-local, a-aggregate, r-redist
Origin codes: i - IGP, e - EGP, ? - incomplete | - multipath
```

Network	Next Hop	Metric	LocPrf	Weight	Path
* i200.0.1.100/32	201.0.25.1		100	100	6553601 i
*>e	201.0.13.1			0	6553601 i
* i200.0.2.100/32	201.0.25.1		100	100	6553601 i
*>e	201.0.13.1			0	6553601 i
*>l200.0.3.100/32	0.0.0.0		100	32768	i

Cisco Nexus 7000 Series NX-OS Unicast Routing Command Reference (August 2013), at 401.

This example shows how to display information about IGMP snooping queriers:

```
switch(config)# show ip igmp snooping querier
Vlan IP Address      Version  Port
1    172.20.50.11    v3      fa2/1
2    172.20.40.20    v2      Router
switch(config)#
```

Cisco Nexus 7000 Series NX-OS Multicast Routing Command Reference (August 2013), at 50.

#### Examples

This example shows how to use the `show port-security` command to view the status of the port security feature on a device:

```
switch# show port-security
```

```
Total Secured Mac Addresses in System (excluding one mac per port) : 0
Max Addresses limit in System (excluding one mac per port) : 8192
```

Secure Port	MaxSecureAddr (Count)	CurrentAddr (Count)	SecurityViolation (Count)	Security Action
Ethernet1/4	5	1	0	Shutdown

```
switch#
```

Cisco Nexus 7000 Series NX-OS Security Command Reference (August 2013), at SEC-661.

#### Examples

This example shows how to use the `show port-security address` command to view information about all MAC addresses secured by port security:

```
switch# show port-security address
```

```
Total Secured Mac Addresses in System (excluding one mac per port) : 0
Max Addresses limit in System (excluding one mac per port) : 8192
```

Secure Mac Address Table				
Vlan	Mac Address	Type	Ports	Remaining Age (mins)
1	0054.AAB3.770F	STATIC	port-channel1	0
1	00EE.378A.ABCE	STATIC	Ethernet1/4	0

```
switch#
```

This example shows how to use the `show port-security address` command to view the MAC addresses secured by the port security feature on the Ethernet 1/4 interface:

```
switch# show port-security address interface ethernet 1/4
```

Secure Mac Address Table				
Vlan	Mac Address	Type	Ports	Remaining Age (mins)
1	00EE.378A.ABCE	STATIC	Ethernet1/4	0

```
switch#
```

Cisco Nexus 7000 Series NX-OS Security Command Reference (August 2013), at SEC-664.



**Examples**

This example shows how to display the EEE status on an interface:

```
switch# show interface ethernet2/6
Ethernet2/6 is down (Link not connected)
admin state is up, Dedicated Interface
Hardware: 10000 Ethernet, address: 0022.5579.de41 (bia 001b.54c1.af5d)
MTU 1500 bytes, BW 10000000 Kbit, DLY 10 usec
reliability 255/255, txload 1/255, rxload 1/255
Encapsulation ARPA, medium is broadcast
auto-duplex, auto-speed, media type is 10G
Beacon is turned off
Auto-Negotiation is turned off
Input flow-control is off, output flow-control is off
Auto-mdix is turned off
Rate mode is shared
Switchport monitor is off
EtherType is 0x8100
EEE (efficient-ethernet) : n/a
Last link flapped never
Last clearing of "show interface" counters never
0 interface resets
30 seconds input rate 0 bits/sec, 0 packets/sec
30 seconds output rate 0 bits/sec, 0 packets/sec
Load-Interval #2: 5 minute (300 seconds)
```

Cisco Nexus 7000 Series NX-OS System Management Command Reference (August 2013), at 514.

**Examples**

This example shows how to display the PTP clock information:

```
switch# show ptp clock
PTP Device Type: Boundary clock
Clock Identity: 0:18:ba:ff:ff:d8: e:17
Clock Domain: 0
Number of PTP ports: 2
Priority1: 255
Priority2: 255
Clock Quality:
Class: 248
Accuracy: 254
Offset (log variance): 65535
Offset From Master: 0
Mean Path Delay: 0
Steps removed: 1
Local clock time: Sun Jan 15 20:57:29 2011
```

Cisco Nexus 7000 Series NX-OS System Management Command Reference (August 2013), at 601.



**Examples**

This example shows how to display information about the parent and grand master of the PTP clock:

```
switch# show ptp parent
Parent Clock:
Parent Clock Identity: 0:18:ba:ff:ff:d8: e:16
Parent Port Number: 1546
Observed Parent Offset (log variance): N/A
Observed Parent Clock Phase Change Rate: N/A

Grandmaster Clock:
Grandmaster Clock Identity: 0:18:ba:ff:ff:d8: e:16
Grandmaster Clock Quality:
Class: 248
Accuracy: 254
Offset (log variance): 65535
Priority1: 255
Priority2: 255
```

Cisco Nexus 7000 Series NX-OS System Management Command Reference (August 2013), at 607.

**Examples**

This example shows how to display the PTP clock properties:

```
switch# show ptp time-property
PTP CLOCK TIME PROPERTY:
Current UTC Offset valid: 0
Current UTC Offset: 33
Leap59: 0
Leap61: 0
Time Traceable: 0
Frequency Traceable: 0
PTP Timescale: 0
Time Source: 0xA0(internal oscillator)
```

Cisco Nexus 7000 Series NX-OS System Management Command Reference (August 2013), at 611.

**Examples**

This example shows how to display the SNMP information:

```
switch(config)# show snmp
sys contact:
sys location: anyplace, Anywhere

0 SNMP packets input
0 Bad SNMP versions
0 Unknown community name
0 Illegal operation for community name supplied
0 Encoding errors
0 Number of requested variables
0 Number of altered variables
0 Get-request PDUs
0 Get-next PDUs
0 Set-request PDUs

0 SNMP packets output
0 Too big errors
0 No such name errors
0 Bad values errors
0 General errors
```

Cisco Nexus 7000 Series NX-OS System Management Command Reference (August 2013), at 634.

**Examples**

This example shows how to display the SNMP engine ID:

```
switch(config)# show snmp engineID  
Local SNMP engineID: [Hex] 80000009030005300A0B0C  
[Dec] 128;000;000;009;003;000;005;048;010;011;012
```

Cisco Nexus 7000 Series NX-OS System Management Command Reference, Release 5.x (April 2010), at 533.

## **HELP DESCRIPTIONS**

Cisco contends that the following multiword help descriptions (also known as help strings, help text, or helpdesc) are protectable elements of Cisco's user interface both individually and as collections of help descriptions associated with specific operating systems, identified below as IOS and IOS-XR. As reflected in the tables below, some help descriptions appear in more than one Cisco operating system. Further, these multiword help descriptions are the result of a creative process within the company and the professional judgment of Cisco employees. As the Court's summary judgment order states: "In *CDN Inc. v. Kapes*, 197 F.3d 1256, 1260 (9th Cir. 1999), a case involving collectible coins, the plaintiff's employees relied upon coin publications, real-world transactions, supply and demand projections, analyze the effect of the economy and foreign policies to determine the wholesale prices of coins. The Ninth Circuit found that prices in CDN's price guides were copyrightable because CDN used its judgment to create the prices." Dkt. 482 at 12. The Court's order then quotes the following passage from *CDN*:

[W]hat is important is the fact that [parties] arrive at the prices they list through a process that involves using their judgment to distill and extrapolate from factual data. It is simply not a process through which they discover a preexisting historical fact, but rather a process by which they create a price which, in their best judgment, represents the value of an item as closely as possible...This *process* imbues the prices listed with sufficient creativity and originality to make them copyrightable.

*Id.* at 13 (emphasis added by the Court). The Court thereafter concluded: "The fact that CDN used a process to determine, in its judgment, the value of coins was enough for the Ninth Circuit to find CDN's prices were copyrightable. The Ninth Circuit did not engage in an analysis of each and every price CDN calculated to determine if it possessed a minimal degree of creativity and originality. Similarly, Cisco has adduced evidence of a process it undertook to create its CLI commands, and such a process is enough to create a genuine issue of material fact." *Id.*

As in *CDN*, Cisco's help descriptions resulted from a creative process. As set forth in Cisco's analytic dissection brief, a device operator may ask for help in using a multiword command expressions by typing a command expression followed by a question mark ("?.") into Cisco's user interface, in which case a textual help description will be displayed on the screen. In the early 1990s, a Cisco contractor named Terry Slattery created the help descriptions in version 9.21 of Cisco's IOS through a creative process whereby he consulted Cisco documents, Cisco devices, and Cisco source code and used his judgment and creativity to create the help descriptions. Thereafter, the Cisco help descriptions were authored according to a creative process whereby a Cisco engineer would create a new command expression and then create a description of that command expression using the engineer's own professional judgment and subjective preferences. When the new command expression was incorporated into Cisco's source code, the help description was input at the same time. Each of these help descriptions could have been written with different combinations of words, sequence, and syntax—their creation is left to an individual Cisco engineer's own subjective, professional judgment.

### IOS

32-bit tag value
48-bit hardware address of ARP entry
AAA group definitions
ARP type ARPA
ASBR summary link states
Administratively shut down this neighbor
Advertising Router (as an IP address)
Advertising Router link states
Always advertise default route
An ordered list as a regular-expression
Assign policy-map to the input of an interface
Assign policy-map to the output of an interface
authentication parameters for the user

Border and Boundary Router Information
Change current directory
class of service
Configure IP address summaries
Configure QoS Class Map
Configure QoS Policy Map
Configure QoS Service Policy
Configure a local or remote SNMPv3 engineID
Configure from the terminal
Configure load balancing
Configure logging for interface
Contents of startup configuration
Control distribution of default information
Copy from one file to another
Current operating configuration
Default domain name
Define a User Security Model group
Define a user who can access the SNMP engine
Define an SNMPv2 MIB view
Define an administrative distance
Delete a file
Delete all multicast routes
Description of the interactive help system
Destination IP address
Destination MAC address
Destination address translation
Destination file path
detailed interface information
Directory or file name
Display OSPF router ids as DNS names
Display current working directory
Display detailed information
Display the contents of a file
Display the session command history
Display the system clock
Distance for external routes
Distance for internal routes
Distance for local routes
Distribute a default route
Enable IP routing
Enable SNMP; set community string and access privs
Enable logging to all supported destinations
Enable proxy ARP
End IP address

End of range
Enter configuration mode
Exit from configure mode
External link states
File to be deleted
File to display
Forwarding router's address
Group to which the user belongs
group using the User Security Model (SNMPv3)
group using the v1 security model
group using the v2c security model
Halt and perform a cold restart
Hello interval value
Hello multiplier value
ICMP message code
ICMP message type
IGMP host query interval
IGMP max query response value
IGMP static multicast group
IP ARP table
IP address of ARP entry
IP address or hostname of a remote system
IP group address
IP interface status and configuration
IP routing table
ip source address
IP subnet mask
Interface specific description
Interface status and configuration
Interval in seconds
Link state ID (as an IP address)
List file information
List files on a filesystem
Load interval delay in seconds
MIB family is excluded from the view
MIB family is included in the view
MIB view family name
MIB view to which this community has access
Modify enable password parameters
Modify message logging facilities
Modify system boot parameters
Multicast Source Discovery Protocol (MSDP)
NSSA External link states
NTP version number
Name of the group

Name of the user
Name of the view
Negate a command or set its defaults
Network time protocol
Network link states
Network summary link states
Number of lines on screen (0 for no pausing)
number of probes
Number of retries to this server for a transaction
OSPF router-id in IP address format
Opaque AS link states
Opaque Area link states
Opaque Link-Local link states
Open a telnet connection
Open a terminal connection
Originate default route to this neighbor
Ping destination address or hostname
Prefix list name
Query interval in seconds
RPF across equal-cost paths
Read-only access with this community string
Reason for reload
Redistribute OSPF NSSA external routes
Redistribute OSPF external routes
Redistribute OSPF internal routes
Redistribution of OSPF routes
Rename a file
Reset a terminal line
Restrict this community to a named MIB view
Route map reference
Router link states
SNMP community string
SNMP version to use for notification messages
SNMPv1/v2c community string or SNMPv3 user name
Select an interface to configure
Self-originated link states
Send Inform messages to this host
Send Trap messages to this host
Send Community attribute to this neighbor
Send echo messages
Set a static ARP entry
Set authentication list for enable
Set authentication lists for logins
Set buffered logging parameters
Set key string

Set priority for Designated Router election
Set syslog server logging level
Set the IP address of an interface
Show QoS Class Map
Show QoS Policy Map
show SNMPv3 groups
show SNMPv3 users
Show detailed Information
Show filesystem information
Show running system information
Show summary information
Show the contents of logging buffers
Source IP address
Source MAC address
Source address translation
Source file path
Spanning Tree Subsystem
Spanning tree topology
Specify a RADIUS server
specify a notify view for the group
specify a read view for the group
Specify a remote SNMP entity to which the user belongs
specify a write view for the group
Specify hosts to receive SNMP notifications
Specify interval for load calculation for an interface
Specify name of the next hop
Stamp logger messages with a sequence number
Start IP address
String to uniquely identify this chassis
Summary of database
Text for mib object sysContact
Text for mib object sysLocation
The HIDDEN shared key
The UNENCRYPTED (cleartext) shared key
The notification host's UDP port number
The physical location of this node
The remote SNMP entity's UDP port number
time in minutes
Time in seconds
Trace route to destination
Trace route to destination address or hostname
Transmission Control Protocol
Turn off privileged commands
Turn on privileged commands
Unique ID string



Use HMAC MD5 algorithm for authentication
Use HMAC SHA algorithm for authentication
Use the SNMPv3 authNoPriv Security Level
Use the SNMPv3 noAuthNoPriv Security Level
User Datagram Protocol
user using the v1 security model
user using the v2c security model
user using the v3 security model
VPN Routing/Forwarding instance
Verify a file
Wait time (default 5 seconds)
ngineID of the local agent
identification of the contact person for this managed node
Name of the next hop
Next hop address
notify view name
Rate in Kbps
read view name
Timeout in seconds
write view name

```

Switch>show ?
aaa                Show AAA values
adjacency          Adjacent nodes
arp                ARP table
auto              Show Automation Template
cca               CCA information
class-map          Show QoS Class Map
clock             Display the system clock
cns               CNS agents
controllers        Interface controller status
crypto            Encryption module
dampening          Display dampening information
diagnostic         Show command for diagnostic
dot1q-tunnel       Display dot1q tunnel ports
dot1x             Dot1x information
eigrp             EIGRP show commands
env               Environmental facilities
epm               EPM information
errdisable         Error disable
etherchannel       Etherchannel information
exception          exception informations
flash:            display information about flash: file system
flowcontrol        show flow control information
format            Show format information
history           Display the session command history
hosts             IP domain-name, lookup style, nameservers, and host table
idprom            show IDPROMs for interfaces
if-mgr            if-mgr information
inventory          Show the physical inventory
ip                IP information
ipc              Interprocess communications commands
ipv6              IPv6 information
kerberos          Show Kerberos values
kron              Kron Subsystem
l2               Layer 2
l2protocol-tunnel Display L2PT status and configurations
lacp              Port channel information
link              Show Link
lldp              LLDP information
location          Display the system location
login             Display Secure Login Configurations and State
mab               MAB information
mac               MAC configuration
macro             Show command macros
memory            Memory statistics
mls               mls global commands
monitor           Monitoring different system events
network-policy    Network Policy profile information
odm-format        Show the schema used for ODM input file
pagp              Port channel information
platform          platform specific show commands
pm               Show Port Manager commands
policy-map        Show QoS Policy Map
power             Switch Power
queue             Show queue contents
queueing          Show queueing configuration
radius            Shows radius information
resource          Resource group statistics
rmon              rmon statistics
sasl              show SASL information
sessions          Information about Telnet connections
shell             Display shell information
snmp              snmp statistics
ssh              Status of SSH server connections
ssl              Show SSL command
storm-control      Show storm control configuration
table-map         Show Table Map
tacacs            Shows tacacs+ server statistics
template          Template information
terminal          Display terminal configuration parameters
time-range        Time range
udld              UDLD information
users             Display information about terminal lines
version           System hardware and software status
vlan              VTP VLAN status

```

```

Switch>show interface ?
Async Async interface
Auto-Template Auto-Template interface
BVI Bridge-Group virtual Interface
CTunnel CTunnel interface
Dialer Dialer interface
FastEthernet FastEthernet IEEE 802.3
Filter Filter interface
Filtergroup Filter Group interface
GigabitEthernet GigabitEthernet IEEE 802.3z
GroupVFI Group virtual interface
Loopback Loopback interface
Null Null interface
Port-channel Ethernet Channel of interfaces
Portgroup Portgroup interface
Pos-channel POS Channel of interfaces
Tunnel Tunnel interface
vif PGM Multicast Host interface
Virtual-Template Virtual Template interface
Virtual-TokenRing Virtual TokenRing
Vlan Catalyst vlans
accounting Show interface accounting
capabilities Show interface capabilities information
counters Show interface counters
crb Show interface routing/bridging info
dampening Show interface dampening info
debounce Show interface debounce time info
description Show interface description
etherchannel Show interface etherchannel information
fair-queue Show interface weighted Fair Queueing (WFQ) info
fcfa Fiber Channel
flowcontrol Show interface flowcontrol information
irb Show interface routing/bridging info
mac-accounting Show interface MAC accounting info
mpls-exp Show interface MPLS experimental accounting info
mtu Show interface mtu
precedence Show interface precedence accounting info
private-vlan Show interface private vlan information
pruning Show interface trunk VTP pruning information
random-detect Show interface weighted Random Early Detection (WRED)
info
rate-limit Show interface rate-limit info
stats Show interface packets & octets, in & out, by
switching path
status Show interface line status
summary Show interface summary
switchport Show interface switchport information
transceiver Show interface transceiver
trunk Show interface trunk information
| output modifiers

```

```

Switch>show ip ospf ?
<1-65535> Process ID number
border-routers Border and Boundary Router Information
database Database summary
interface Interface information
max-metric Max-metric origination information
mpls MPLS related information
neighbor Neighbor list
sham-links Sham link information
statistics Various OSPF Statistics
summary-address Summary-address redistribution Information
timers OSPF timers information
traffic Traffic related statistics
virtual-links Virtual link information
| output modifiers
<cr>

```

IOS-XR

AAA group definitions
Specifies that an UNENCRYPTED key will follow
Label value
Exit from configure mode
Configure from the terminal
Include lines that match
Exclude lines that match
Begin with the line that matches
No accounting
User Datagram Protocol
Global IPv6 configuration commands
BFD information
Display the system clock
Show controller information
Packet counters
debug counters
Interval in seconds
Detailed information
Priority level
object name
Copy from current system configuration
Update (merge with) current system configuration
Display the contents of a file
Current operating configuration
Rule number
Tunnel ID
Version number
IGMP host query interval
Query interval in seconds
Multicast source address
Detailed interface information
Specify interface
VLAN ID
Select an Interface to configure
Interface status and configuration
disable the interface
Specify interval for load calculation for an interface
MTU (bytes)
Interface events
Prefix length
Set IPv6 Router Advertisement Interval
Interval in milliseconds

IPv6 information
Global IPv6 configuration commands
IPv6 interface status and configuration
Brief output
Set advertised NS retransmission interval
Time to Live value
Entry index
Destination IP Address
48-bit hardware address of ARP entry
Brief output
IP routing table
MAC address
interface filter
Enable proxy ARP
Enable local proxy ARP
route distinguisher
Address family IPv4
Address family IPv6
Default vrf
Time interval in seconds
Port Description TLV
System Name TLV
System Description TLV
System Capabilities TLV
Management Address TLV
Show the contents of logging buffers
Set buffered logging parameters
all modules
Number of lines on screen (0 for no pausing)
Detailed information
Multicast Source Discovery Protocol (MSDP)
Show detailed information
Interface Name
Interface filter
TCP protocol
UDP protocol
Send echo messages
IPv4 echo
IPv6 echo
Ping destination address or hostname
Repeat count
datagram size
Timeout in seconds
Trace route to destination
IPv4 Trace

IPV6 Trace
Trace route to destination address or hostname
Open a telnet connection
Port number
Network time protocol
NTP status
NTP associations
Key number
NTP version number
port Id
Port name
Display detailed information
Host name
Sequence number
next hop address
Differentiated Services Code Point (DSCP)
Display information for a specific interface (show PFC is Arista's)
Detailed information
Hello interval
Neighbor filter
Detailed interface information
IP routing table
Number of MAC addresses
Show PTP interface information
Set IP DSCP (DiffServ CodePoint)
Show detailed output
Time in minutes
Specify a RADIUS server
Radius configuration (RADIUS was Arista's)
route distinguisher
Sequence number
Next Hop
AS Number
BGP timers
Keepalive interval
Hold Time
Open Shortest Path First (OSPF)
Redistribution of OSPF routes
Redistribute OSPF external routes
Redistribute OSPF internal routes
Administratively shut down this neighbor
Define an administrative distance
BGP distance
Delay value (seconds)

IPv4 address family
IPv6 address family
IS-IS instance name
Address Family modifier
Suppress routing updates on this interface
Detailed Output
Neighbor information
Process ID
Control distribution of default information
Distribute a default route
Metric value
Database summary
Advertising Router link states
Self-originated link states
Filter by Interface Name
Border and Boundary Router Information
Interface information
Neighbor list
Display OSPF router ids as DNS names
Enable authentication
Suppress routing updates on an interface (in is arista's)
Control distribution of default information
Distribute a default route
Brief interface information
Neighbor information
Advertising Router link states
Self-originated link states
ASBR summary link states
External link states
Network link states
NSSA External link states
Opaque Area link states
Opaque AS link states
Opaque Link-Local link states
Router link states
Network summary link states
Define an administrative distance
Redistribution of OSPF routes
Redistribute OSPF external routes
Redistribute OSPF internal routes
Connected routes
Threshold value
Time in minutes
Traffic class
Source MAC address

Destination MAC address
VLAN ID
SNMP statistics
Name of the group
Name of the user
Name of the view
SNMP community string
MIB view to which the community has access (this is Arista's)
String to uniquely identify this chassis
Unique ID string
Text for mib Object sysContact
identification of the contact person for this managed node
Configure a local or remote SNMPv3 engineID
engineID of the local agent
engineID of a remote agent
Text for mib Object sysLocation
The physical location of this node
Define an SNMPv2 MIB view
MIB view family name
MIB family is included in the view
MIB family is excluded from the view
Define a user who can access the SNMP engine
Group to which the user belongs
Specify a remote SNMP entity to which the user belongs
authentication parameters for the user
Use HMAC MD5 algorithm for authentication
Use HMAC SHA algorithm for authentication
user using the v1 security model
user using the v2c security model
user using the v3 security model
Define a User Security Model group
group using the v1 security model
group using the v2c security model
group using the User Security Model (SNMPv3)
Context name
read view name
Specify a write view for the group
write view name
specify a notify view for this group (the is Arista's)
notify view name
Specify hosts to receive SNMP notifications



Send Trap messages to this host
Send Inform messages to this host
SNMP version to use for notification messages
Port number
Group number
Set TACACS+ encryption key
Wait time (default 5 seconds)
Specify a TACACS+ server
Sequence number
Select an interface to configure (OR clear OR filter OR show, Arista's was monitor)
User name
Virtual terminal
No accounting
Topology Information
Track an interface
Brief output
Session information
Global IPv6 configuration commands
IPv6 information
Clear platform information
Default VRF